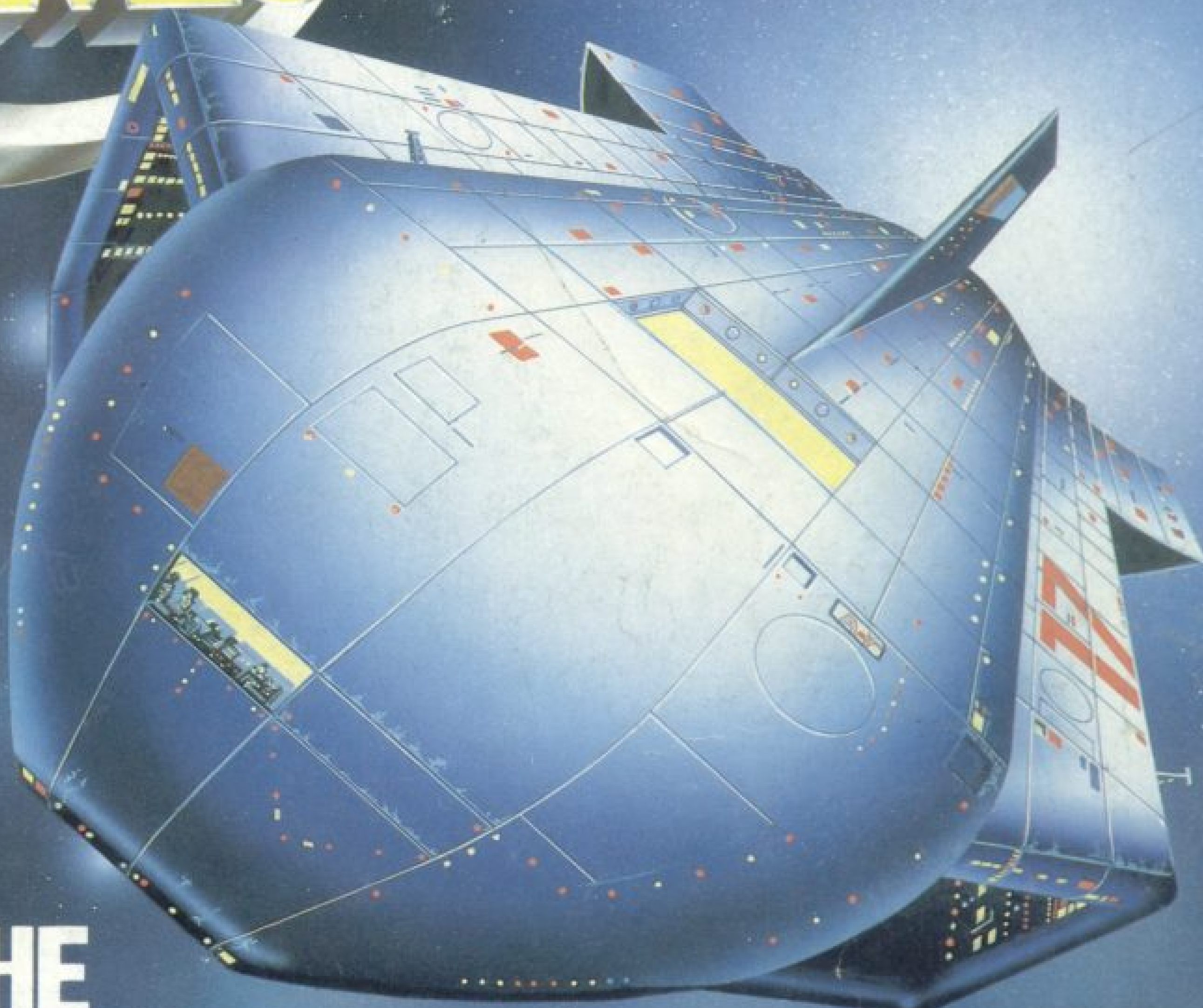
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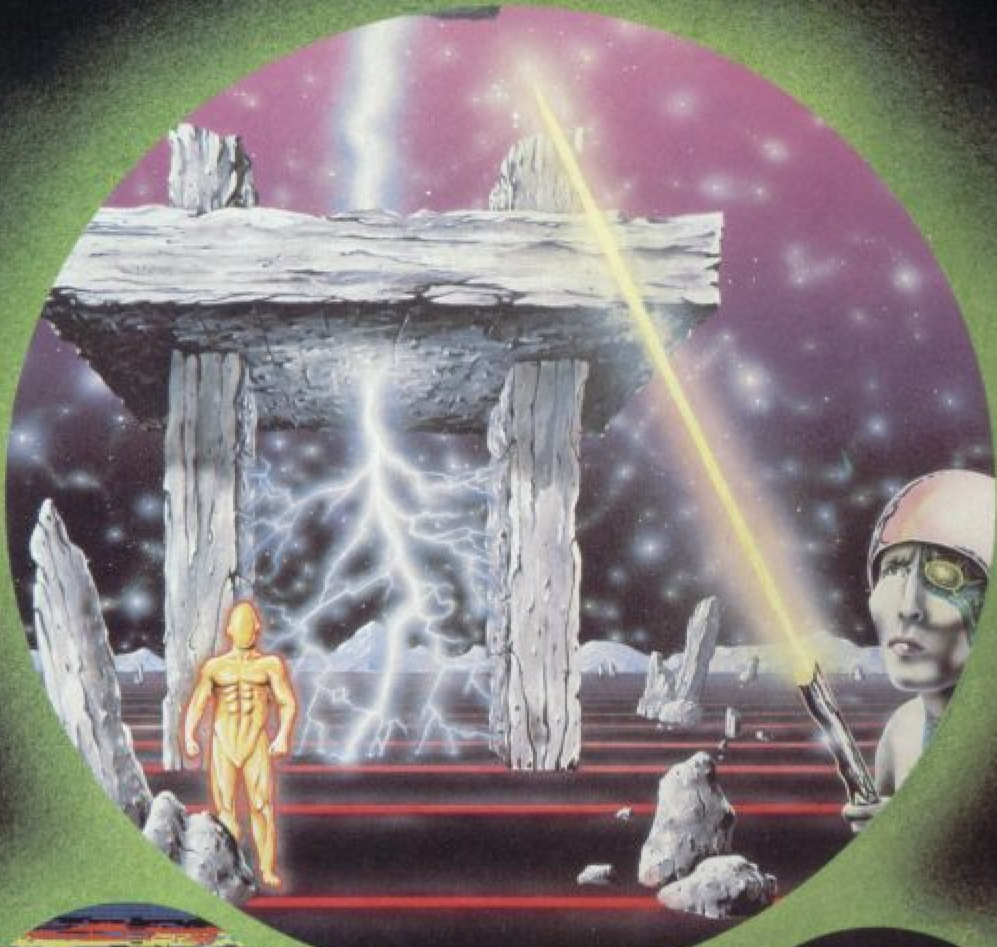
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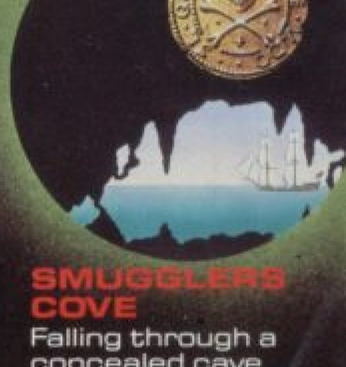


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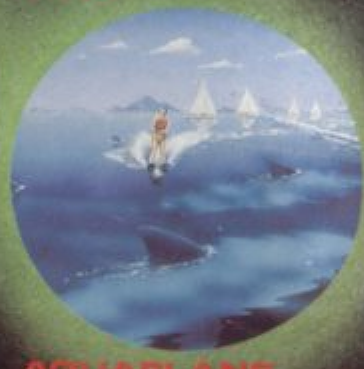


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News & Reviews



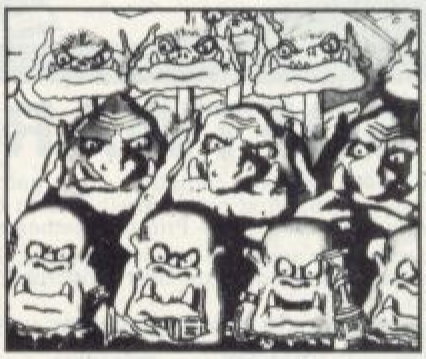
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New Dimensions...

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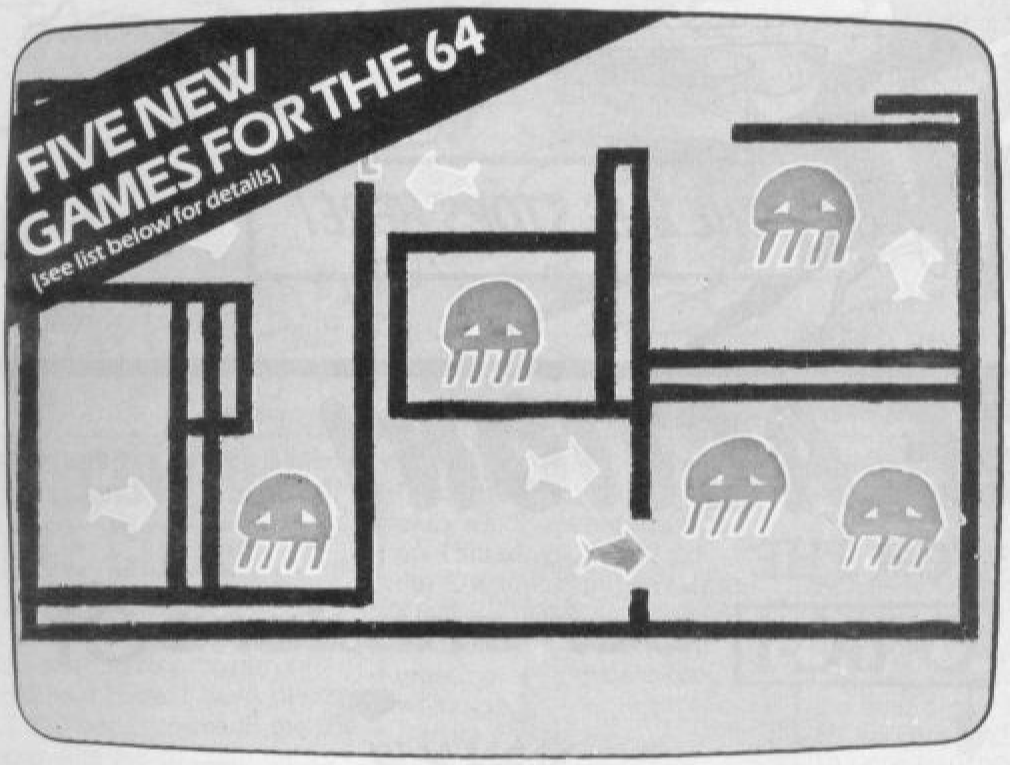
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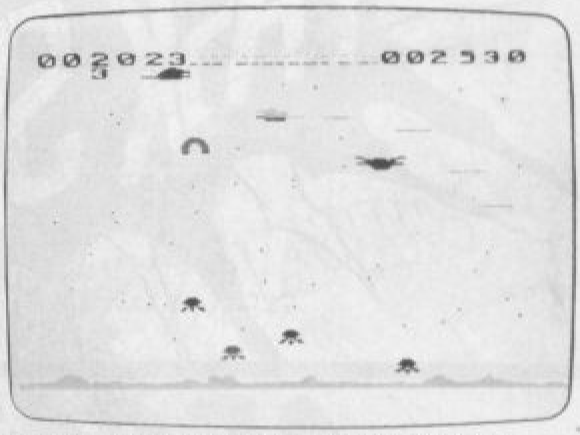
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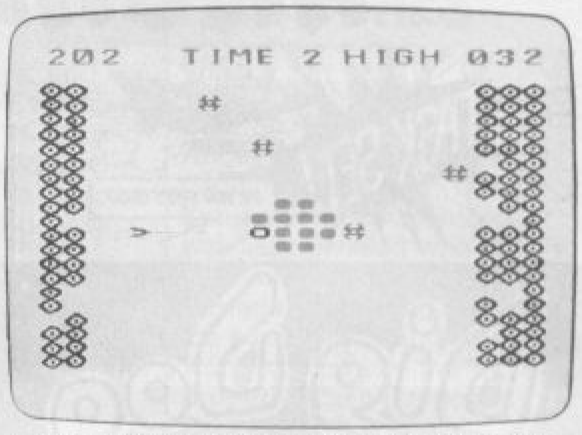
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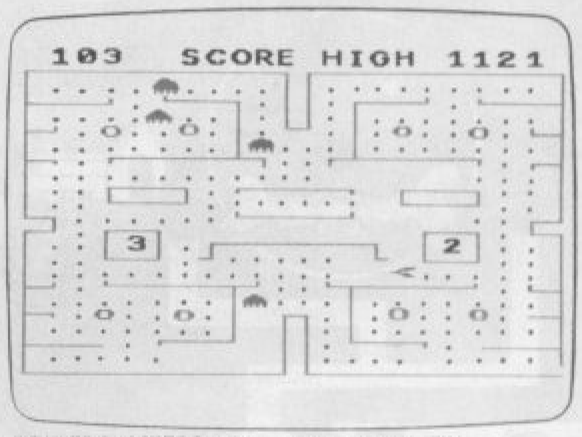
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DISCOVERING THE CODE

Dear Sir,
I own a 48k Spectrum and I am starting to program in machine code. I have plenty of Z80 books to teach me the language but to continue I need a book which will tell me how to print a character, plot a pixel or sound a beep. Is there such a book?
S. Freshwater,
Leiston,
Suffolk.

Editor's reply: If you need a detailed book about programming the Spectrum in machine code then I recommend The Complete Spectrum Rom Disassembly, published by Melbourne House. It costs £9.95 and contains a complete disassembly of the 16k ROM including the cassette routines and the floating point calculator.

As for printing a character, simply place its ASCII code in the accumulator and call RST 10 (hex). Plotting a pixel is done by the machine code equivalent of POKE, ie LD A, character then LD screen address, A.

MUTUAL AID SOCIETY!

Dear Sir,
I couldn't believe it. Keith Campbell stuck in *Mystery Fun House!* It can't be! I read the article again. It is!!! Oh well, gone are the visions of a man capable of solving the *Zork Trilogy* in a single sitting.

So, I thought, he is human after all! I enclose a couple of clues for him — after all, he did save me from a nervous breakdown trying to solve *Mission Impossible* back in December!

Whilst writing, I wonder if readers could be informed of MACE (Manchester Atari Computer Enthusiasts), a new club which meets fortnightly on Thursdays at 7.30 pm. at the Ellesmere pub, Walkden. All those keen on the Atari, near enough to attend a meeting, would be most welcome!
Darren Evans,
Little Hutton,
Manchester.

KONG HAS A DOUBLE?

Dear Sir,
I am writing in reply to a question posed by Mr J. Bull of Eastbourne *(Mailbag, August)* concerning his adventures on Donkey Kong machines. As he may, or may not know, there are in fact two versions of this machine available.

The first of these is the original Donkey Kong machine of which there are not many around. These machines have been snowed under by what I can only assume is a "pirate" version of the game named Krazy or Crazy, Kong. The latter games contain a bug in the program which prevent the player scoring over 400,000 points. The original Donkey Kong has no such problem.

May I suggest to Mr Bell that in order to increase his score of 428,300 he will have to play the original game.
Andrew Corbett,
Pear Tree,
Derby.

SOME SOUND ADVICE . . .

Dear Sir,
When experimenting with sound on my TI 99/4a I discovered that by using the following sound statement a good effect can be produced.
CALL SOUND (−4250, 110, 0, 111, 0, 112, 0)

Another interesting effect is to use a chord of the same note but in a different octave i.e. CALL SOUND (−4250, 110, 0, 220, 0, 440, 0) where 110, 220 and 440 are the values of the note A in three different octaves.

Several sound imitations can be produced, in this case the sound of a ball bouncing off an alley wall:—

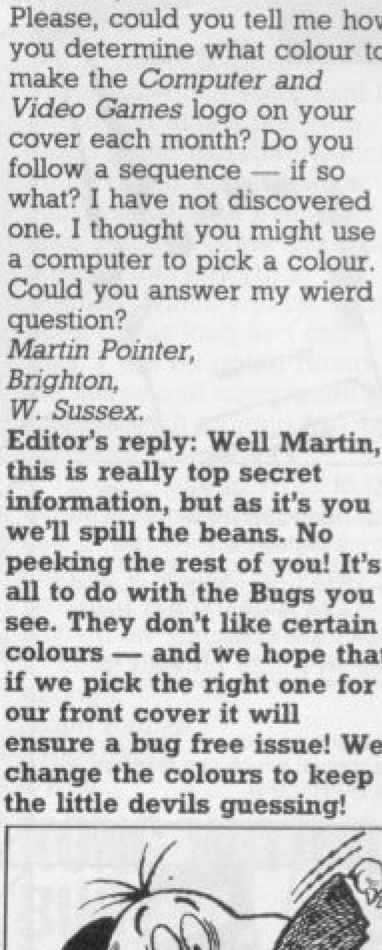
```
10 FOR I=0 TO 30
20 CALL SOUND (−300, −5, I)
30 NEXT I
40 GOTO 10
```

Richard Moore,
Preston,
Dorset

COLOURFUL QUESTION!

Dear Sir,
Please, could you tell me how you determine what colour to make the *Computer and Video Games* logo on your cover each month? Do you follow a sequence — if so what? I have not discovered one. I thought you might use a computer to pick a colour. Could you answer my wierd question?
Martin Pointer,
Brighton,
W. Sussex.

Editor's reply: Well Martin, this is really top secret information, but as it's you we'll spill the beans. No peeking the rest of you! It's all to do with the Bugs you see. They don't like certain colours — and we hope that if we pick the right one for our front cover it will ensure a bug free issue! We change the colours to keep the little devils guessing!



BAD TIMES WITH VIC

Dear Sir,
About seven months ago my parents bought me a Vic-20. For the first four months I was very pleased with the machine — but then things started to go wrong. Firstly the sound went, and then it wouldn't tune into the TV properly. Then the power light failed. It was taken back to the shop where it was purchased and replaced. Now I have no problems — but a friend also purchased a Vic two months ago and experienced similar problems to mine.

Has anyone any idea why some machines suffer these faults? And have any other Vic owners had similar experiences?
Stewart Nightingale,
Canonbrie,
Dumfrieshire.

Editors reply: Can anyone help Stewart?

GORFIAN FAN HITS OUT!

Dear Sir,
I read the review of Gorf for the Vic-20 in your August issue and I strongly disagree with your reviewer.

It says that in the first screen you must find a space in the force-field to fire through, but you can actually fire *through* it. Also the graphics are the best I have seen on the unexpanded Vic.

When the arcade original came out I tackled it until I became a Space Avenger.

The only thing the Vic game lacks is the voice! Your reviewer describes the game as a "reasonable conversion" but the quality is as good as the Bally-Midway original.
K. J. Charlton,
Thornton Heath,
Surrey.



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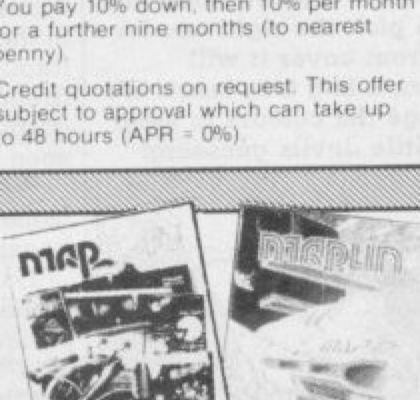
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MAILBAG



HEATWAVE WARNING!

Dear Sir,
I would like to issue a warning to all other Sharp owners! Unfortunately during the recent hot spell any Basic tapes left either in or out of their boxes and exposed to sunlight will perish. I learnt the hard way and lost three tapes. I only discovered that the tapes would not work when I loaded a tape and attempted to start to program. The program refused to run and found non-existent errors. All the more reason to make a back-up tape!
Andrew Baum,
Pinner,
Middlesex.
Editor's note: There's a warning to all of you out there — and not just Sharp owners. Take good care of your tapes and discs and store them in a cool, dust free place.

BBC vs ATARI DEBATE . . .

Dear Sir,
I write to you concerning Mr Paul Ippaso's letter *(Mailbag, July)* dealing with Defender variations for the Atari and BBC micros. Judging from his views it is clear that he has a grudge against the BBC for some reason.

As a BBC owner, I admit that the variety and excellent quality of Atari software is unchallengeable but a price has to be paid. The cost of a program for the Atari is, on average, three times the price of those for the BBC — of the same quality.

Mr Ippaso also says that it's easier to play Defender with joysticks. I disagree, although I must admit that it took quite a while to master the keyboard functions — but once mastered it's just as easy as a joystick. Anyway Planetoids can be played with Quickshot joysticks from Microstyle.

Mr Ippaso also seems to think that Acornsoft are the only quality manufacturers of BBC programs (joke!?). Has he never heard of Big Byte, JJK, Superior Soft, Micropower etc, etc who produce software of the same quality as Acornsoft.

My second point concerns your poor review of Hopesoft's *Escape from Orion.* Having played this game I can clearly state that your version is not functioning properly. When you clear screen one you DO automatically go onto the second screen. Also you CAN climb up ladders as you must reach the spaceship in order to get to the next screen. It is an excellent game and the graphics are really superb. I'd recommend this to anyone.
Satrinda Alg,
Fulham,
London.

THE LAST FEW WORDS

Dear Sir,
As a proud owner of a BBC B — that's how Mr Ippaso started, I believe! — I totally agree with you on the Planetoids v Atari Defender issue. Planetoids is perfectly playable, despite the seemingly impossible number of keys!

Also Mr Ippaso talked about the restriction to Acornsoft software. Rubbish! Take Program Power's *Killer Gorilla* for instance. This amazing game is a masterpiece of programming at £1.50 or less than all the Acornsoft games.

As regards Mr Roberts' letter in your last issue, I am afraid I have to prolong the debate. Any BBC owner will say his micro is great value for money and a Spectrum owner would choke at the mere idea of buying a BBC! For every command a Spectrum owner gives me that a BBC hasn't I'll give him ten that the Beeb has that the Spectrum hasn't!

By the way, does anyone know how to connect up the eight lamps to the user port? I'd be grateful if someone could help me.
R. J. Conlong,
Barnard Castle,
Co. Durham.
Editor's reply: And with these well chosen words we draw the Atari v BBC debate to a close.



Illustration: Jon Davis

OUR CHAMP'S MARATHON

Dear Sir,
Having just received my prize I thought it high time I sent my thanks to you and Taitel for organising one of the most thrilling days of my life — the 1983 Arcade Games Championships.

I found it a great experience and hope I can qualify next year, perhaps on Galaga — my machine if it becomes popular enough. It's a great game — I've already scored 420,000 after four days of playing. By the way, what is the current British high-score?

Turning to a different matter of which you might be interested in is a non-stop video game marathon which I'll be doing for charity on 25th August. The event will take place at Great Darkgate Street, Aberystwyth at "Raffles" which will be kept open for as long as I can play. I will be going round all the shops and companies in Aberystwyth looking for sponsors.

I'll also have to write to the Guiness Book of Records to see if they're interested in starting a section on video games. I plan to start at 8.00am on Thursday 25th and to keep playing until I've had enough.
Julien Rignall,
Tregaron,
Dyfed.

KONG WITH A BUG?

Dear Sir,
In Mailbag August you had a report from J. Bull of Eastbourne who played Donkey Kong and when he reached 400,000 the game went wrong and he lost all his lives.

I also have discovered that at 322,200 when I was on the first screen level 14 on the second platform up I lost my lives, when there were no barrels or fireballs near me.

This happens every time I reach 300,000 and I can get that with my first man, then I lose the other three lives on the second girder up. Have any other arcadesters experienced this?
G. R. Parker,
Northampton,
Northamptonshire.
Editors' reply: It could be that some versions of Donkey Kong do have a bug in them at a later stage. But we have come across scores well in advance of 320,000 so the problem can't be too widespread.

Still if any more of you are experiencing problems, please let us know exactly which machine is causing the problems and we'll investigate.

KILLER REVIEW!

Dear Sir,
Thank you for reviewing our program *Killer Gorilla.* However the excellent write-up was flawed by the mention of a bug in the program. The reviewer claims that Mario falls down dead for no apparent reason on the third level.

Surely he noticed the bonus score table ticking away in the top right-hand corner of the screen.

When this gets to zero you lose a life — presumably what happened to your reviewer. This has never been reported before, despite the fact that this is the fastest selling program we've ever had.

Although the third screen is quite a challenge — your reviewer didn't manage to clear it — an eight-year-old who owns the game has no problems clearing all four screens and the first two on the next level — a score of 35,000. The highest score recorded so far is 68,200 though a score of 134,000 has been rumoured.
Christopher J. Payne,
Micro Power Ltd,
Leeds.

WIN THE GAME OF THE FILM

David Lightman is our idea of the average *Computer and Video Games* reader. He enjoys playing video games, is nuts about computers and is a bit of a rebel at heart. David is the star character of a new film all about computers called *War Games* which should be at your local cinema very soon.

David is a whizz at getting computers to do just what he wants them to. He even persuades the school computer to change his grades for him so he won't have to do extra work during the summer holidays.

But he gets into real trouble when he inadvertently contacts a mysterious computer system while attempting to bootleg some brand new games from a software company using his trusty modem.

The "games" he finds are not designed for livening up a wet afternoon. He has unwittingly tapped into the American Defence Department's war games computer, called JOSHUA. And the "game" he wants it to play could end in all-out nuclear war and the destruction of this planet! You'll have to see the film to find out what happens.

You can play a safer version of the deadly game David gets involved in thanks to Thorn-EMI. They have just released a major new title called *Computer War* based on the theme of the film.

And *Computer and Video Games* have six of these brand new games to give away thanks to Thorn-EMI.

All you have to do is answer the three questions below about computers featured in recent hit movies and send your answers, on postcards only please, to War Games, Computer and Video Games, Durrant House, 8 Herbal Hill, London, EC1R 5EJ.



David (Matthew Broderick) and Jennifer (Ally Sheedy) in a scene from WarGames.

Thorn-EMI are producing the games for the Vic-20, Texas TI 99/4a and the Atari 400/800 — so please tell us which computer you own on your postcard, otherwise we won't be able to send you your prize.

The first six correct answers out of the *C&VG* memory bin will receive a prize. Normal competition rules apply and the editor's decision is, as usual, final.

The questions are as follows:

1. What was the name of the evil computer which took over the spaceship in Stanley Kubrick's film 2001?

2. In Walt Disney's Tron, another evil computer was out to take over the world. What was it called?

3. A famous comic book hero has recently been battling it out with a heavily armed computer system in the latest movie about his adventures. What is his name?

Remember, please put your answers on a postcard or stuckdown envelope. It makes sorting out your entries so much easier for our hardworking competition crew. The closing date for entries is October 16th — so get those brains in gear!

OUR £5,000 CHALLENGE

Put a special effort into your next program — it could be worth £5,000.

There's £5,000 in good honest cash going to the winner of our August competition to find Britain's brightest programming talents.

The prize comes from Calisto Software of Birmingham which is keen to expand the number of machines it covers and use home-grown programmers rather than ship in games from the US.

Calisto's Mike Woodroffe believes it takes three months to write a good games program and that's what you've got. If you're starting from scratch, your program must be finished by October 16th.

If you are going to polish up one of your previous efforts, then why not send it quickly and get started on another program. You can enter as many programs as you like as long as each comes with an entry form cut from the magazine.

To enter, simply fill in the form below and attach it to a cassette of the game. Make sure you fill in all the details about yourself and your game on the form.

If the game instructions are not included on the cassette itself, then add them on a separate piece of paper but please ensure that your name and address are included on every part of your entry.

The winner will be the reader who comes up with the best commercial program, and Calisto will also pay royalties on all copies sold. Remember all published entries will be given a software contract, possibly worth a lot of money.

The judging time is limited so get your entry in as quickly as possible but be sure that your program is properly polished first, to give yourself a good chance of coming away £5,000 richer.

The entries must be sent to: £5,000 Program, Calisto Software, 119 John Bright Street, Birmingham B1 1BE.

Please enter this program in the £5,000 program competition

Program name: ....

Machine: .... **Model:** ....

Number of K needed to run it: .... **K**

Other equipment needed to run it: ....

Author's name: ....

Address: ....

....

Telephone No: ....

All entries will be the property of Calisto Software and the entrants will assign all rights, patents and privileges of their game to Calisto.

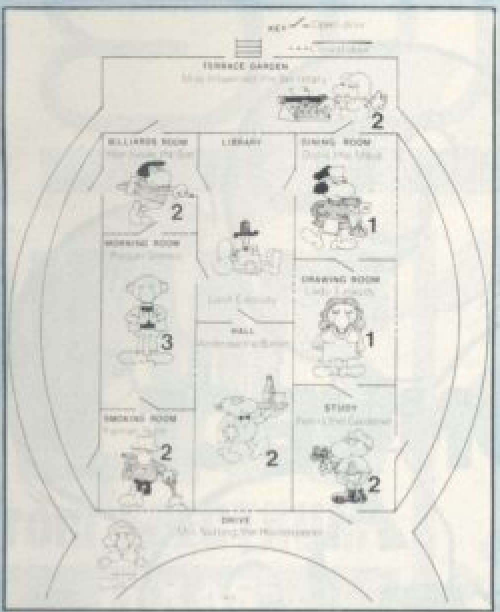
No employees of *Computer & Video Games*, Calisto, or their relatives, will be eligible to enter the competition.

All entries must be sent in with an original coupon from *Computer & Video Games* — NOT A COPY.

The judge's decision is final and no correspondence can be entered into.

You can enter any number of programs as long as each is sent in with a form from *Computer & Video Games*. Winners will be notified before October 30th.

TION COMPETITION COMPETITION CO



No, Trevor Truran, our ace puzzler, wasn't being extremely obscure last issue. The Bugs, driven from the computer room by Bug Hunter, decided to revenge themselves on our production department and erased some vital clues from Trevor's Sherlock puzzle. We've since replaced the missing bits and you'll find the corrected illustration above. Apologies to Trevor and all you frustrated puzzlers out there. . . .

ZZOOM! FREE TAPE TIME!!

Last month it was Manchester. This month it's Liverpool. So if you live there get your scissors out and hack out the coupon below. What's it all about? Free Imagine games that's what!

We've got 100 tapes up for grabs and the first 100 people who request each cassette on the coupon will get one absolutely free — thanks to Imagine.

There's only one catch — your letter or postcard **must** have a Liverpool postmark.

This month's Imagine give-away tape is Bewitched — a combination of a maze game, an Adventure, and a strategy game — all in one.

You are trapped in a maze full of locked doors and must escape before the dreaded ghosts get you!

Unlock the doors with a key — you may find another door, a brick wall — or the exit.

It's just like being trapped inside one of those Russian dolls!

So fill out the coupon and rush it to us at *Computer and Video Games*, Free Games, Durrant House, 8 Herbal Hill, London EC1R 5EJ. Next month the Imagine city will be Portsmouth, so all *C&VG* readers in that seafaring city should rush to their newsagents on October 16th and get in early to avoid the rush!

December could bring an extra Christmas treat to your home town — so watch this space!

Please send me a copy of: Bewitched for the Vic-20

Name ....

Address ....

....

VOTE FOR THE GOLD STICK AWARDS . . .

Do you have a favourite game that is worth its weight in gold? Or a software company you would like to reward for its high standards and prompt service?

Here at *C&VG*, we decided that the best of British software houses deserved the chance to win some recognition after a hard and competitive year which has seen games programming standards rising fast.

We are sponsoring five Golden Joystick Awards which we hope will become the UK Oscars of games programming.

This is your chance to nominate a company which has given good service or earn recognition for the game which has given the most pleasure in the last nine months (since November 1982).

Our five categories are:

- Best Arcade-style Game, which goes to the cassette or cartridge which proves itself the most addictive and thrilling.
- Best Strategy Game, is the title bestowed on the finest cassette or cartridge to test the mind rather than the trigger finger — like a favourite adventure.
- Best Original Game Idea goes to a company which has come up with a game of a completely new type, unlike any board, arcade or computer game seen before.
- Software House of the Year goes to the company which has earned the best reputation for quality games, good service and entertaining advertising.
- Game of the Year is the most coveted Golden Joystick of all, awarded to the game which most impresses the judges in '83.

This game must first have won one of the previous games categories and where that has happened the second-place cassette is promoted to take that title.

Initially we are leaving the judging up to you and want you to tell us your nominations in any of the categories.

Just pick out your favourite games and fill in the form below.

The title Software House of the Year is open to distributors of overseas software, but for the rest, we are looking for British-based games programmers.

Cut out the form below and make your vote for gaming quality count. Send it to:

The Golden Joysticks, *Computer & Video Games*, Durrant House, Herbal Hill, London EC1R 5EJ.

Please accept the following nominations for the Golden Joystick Awards.
(BLOCK CAPITALS PLEASE)

1) Best Arcade Type Game: ....
By (Software house): ....

2) Best Strategy Game: ....
By: ....

3) Best Original Game: ....
By: ....

4) Software House of the year: ....

5) Game of the year: ....
By: ....

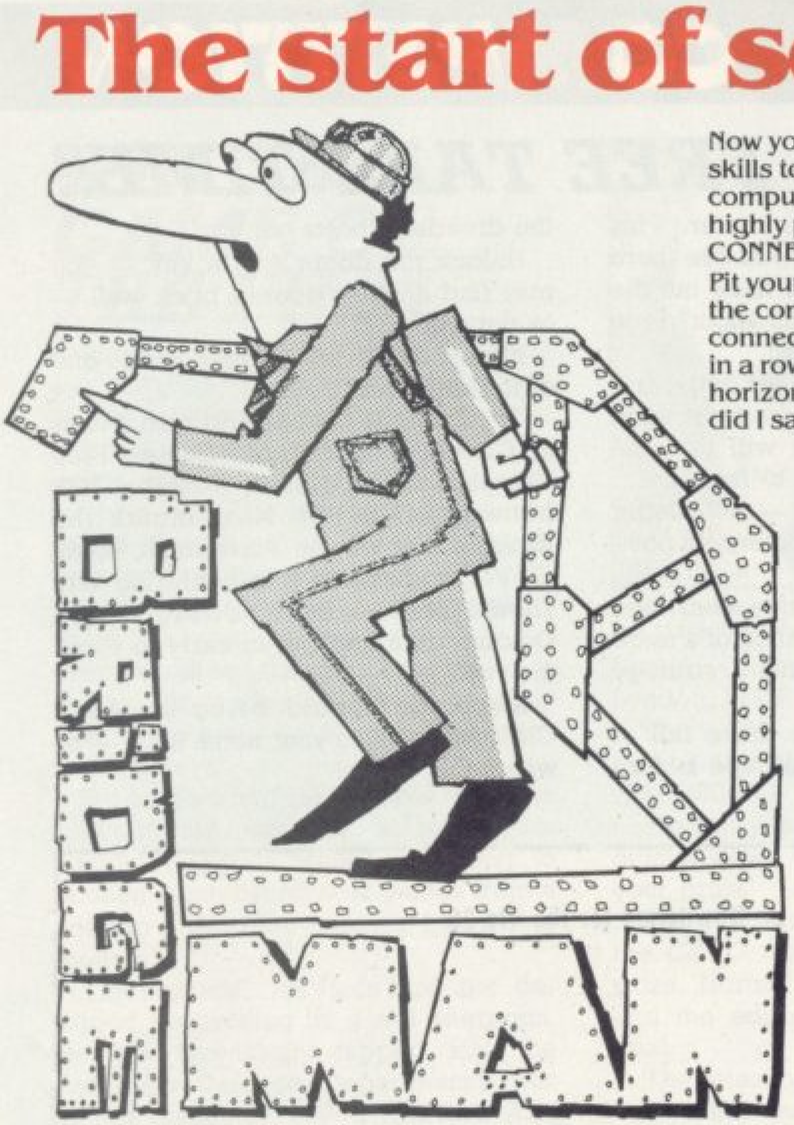
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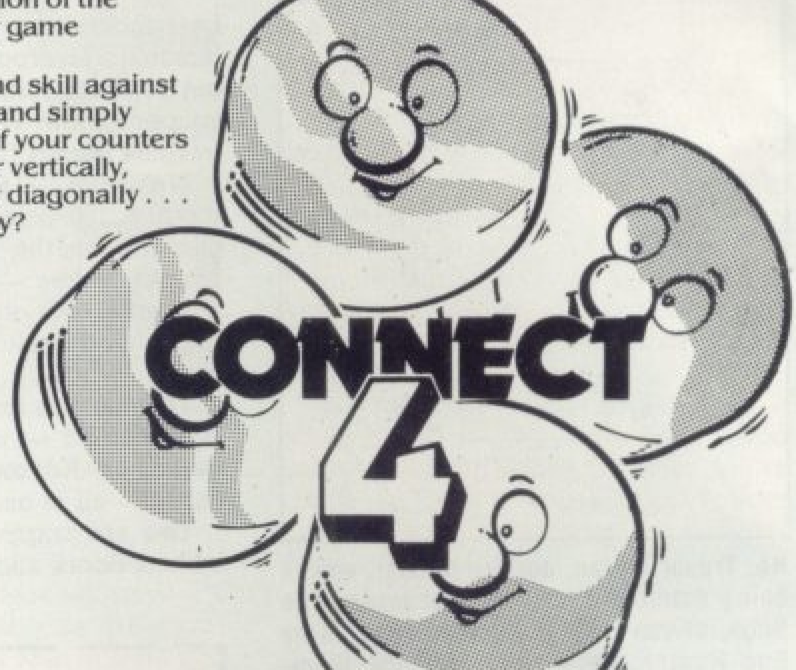
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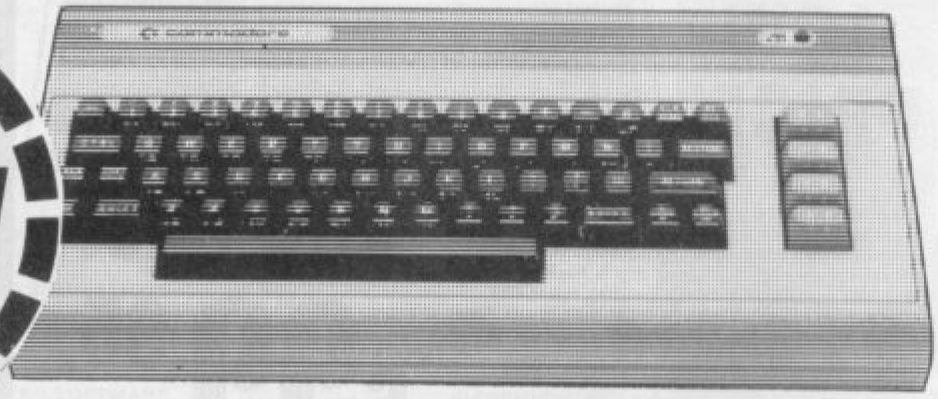
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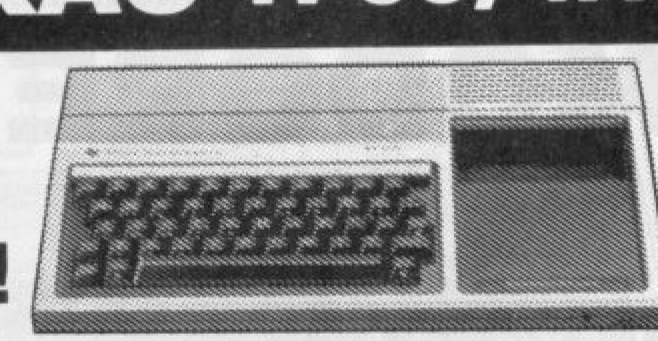
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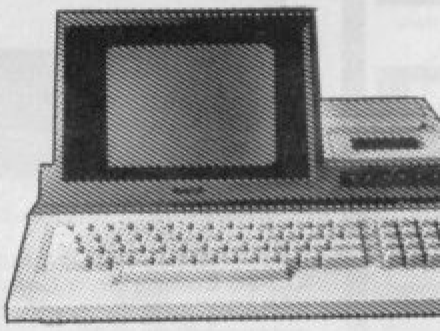
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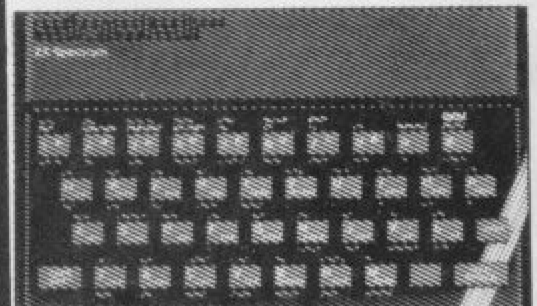
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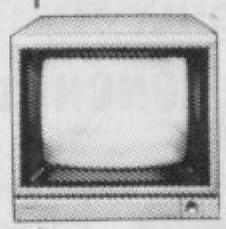
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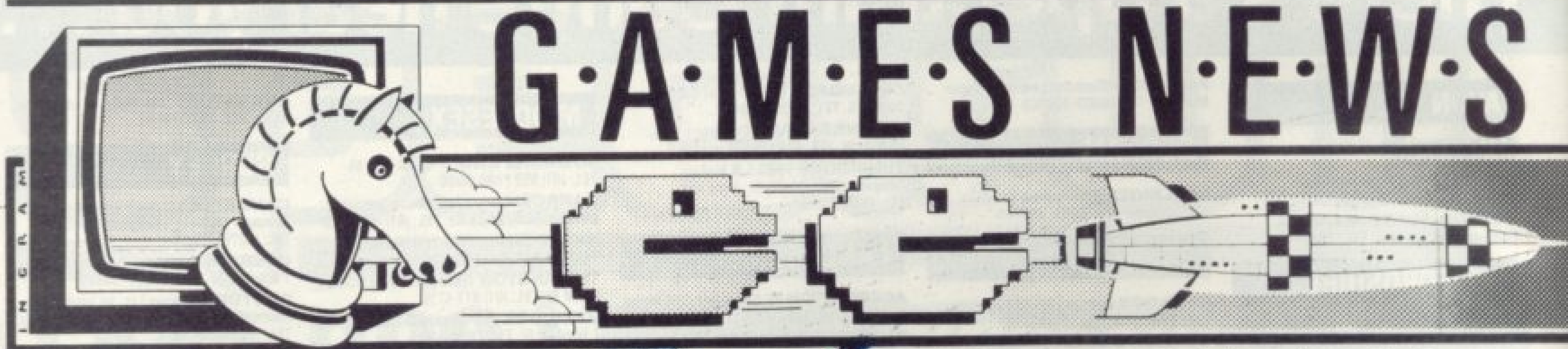
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GAMES NEWS



FASTER WAY TO LOAD YOUR GAMES

MICRODRIVES

Spectrum owners who spend a long time waiting for games to load from casette can now buy the long-awaited Microdrive.

The unit, which is not a disc drive as people first thought, is a miniature high-speed cassette recorder. The cassettes are of the endless loop variety and contain around 20 feet of tape which is less than 2mm wide.

There are no buttons on the machine; you don't need to press play or record. Control is handled entirely by the Spectrum by use of the red keywords under the top row of keys.

Saving and loading programs is much easier with a microdrive than with cassettes. To save a program you type SAVE *"m";1;"programname" where the ;1; means save to the first microdrive. The same format is used for load and verify. If the programs are machine code then you simply put CODE or SCREEN on the end.

You can load your favourite game much faster with a microdrive, and Adventure-type games could be given a whole new lease of life with the microdrive.

Programs could be written in more than one section with each stage being loaded by microdrive during the game. It is possible to store up to 100k on a cartridge which could produce some really massive adventures.

Although Sinclair have promised to release its official software on Microdrive cartridge as well as cassette this may cause problems if you have bought a program on casette. You won't want to buy a microdrive copy and the cassette will be protected.

The microdrives cost £49.95 and you'll also need a ZX Interface at £29.95. One Spectrum plus interface can handle up to eight microdrives.

Illustration: Jon Davis



JUST DROP IN FOR SOME ACTION

PARATROOPER

If any of your friends are in the habit of dropping in unexpectedly then you can always show them Paratrooper.

Paratrooper a new game from Rabbit Software, is loosely based on space invaders but instead of marauding aliens you are faced with enemy helicopters laden with soldiers. Your job is to shoot down the helicopters and the parachutists who float down to the ground.

If you allow more than three paratroops to reach the bottom of the screen the will walk off and return with a tank to destroy your anti-aircraft gun.

The game includes hi-res color graphics, and I am assured that the game becomes very challenging in its later stages.

Paratrooper, from Harrow-based Rabbit Software will be available in early September for the basic Spectrum costing £5.95.





BOARD GAME WORTH CHECKING ON!

DRAUGHTS

Computer draughts is the latest offering for board games fans with a BBC B. It provides a challenge to both the novice and the "grandmaster" alike.

You can pit your wits against the computer at any of nine skill and speed response levels. But this program is not satisfed with simply being a patient opponent.

It will act as an umpire when you want to play a human opponent. And it might give you a few tips if you watch it play a game against itself. Other features include a step by step replay of games and the ability to load and save games on tape.

Draughts comes from Computer Concepts and runs on the BBC B. It will be on sale in early September and will retail at £8.95.

WHY JACK HAS A NEW DOUBLE

NAME GAME

When Imagine launched their already popular Jumping Jack game for the Spectrum they jumped into a bit of bother.

Sumlock Microware of Manchester were already selling a game called Jupin' Jack for the Vic-20. Although the games have the same name they are totally different in concept.

Both companies had run searches at the Trade Marks Registry, but Sumlock did not register their name. Nevertheless Sumlock Microware have prior rights to the name due to their earlier use of the title.

In order to solve the problem Imagine Software have agreed to re-name their game "Leggit" when it goes into production for use on other computers. It is currently being written for the Atari 400-800.

Sumlock Microware will contine to produce their program Jumpin' Jack for the Vic 20 including a version for the CBM 64 and will shortly be rewriting it for other popular micros.

They have also agreed that Imagine can use the name Jumping Jack for the Spectrum game only.

G·A·M·E·S N·E·W·S



BOLDLY GO INTO REAL DEEP SPACE

3-DEEP SPACE

As you've probably already noticed this issue has a big bias toward 3D!

3-Deep Space for the BBC model B is the first of a new generation of sophisticated home computer games which have a true stereoscopic display.

Wearing your red-and-blue 3D glasses, which are provided in the software package — or on the front of this magazine — you'll see a space panorama stretching deep into your TV.

In the foreground an avenue of floating pyramids reaches out towards you. Beyond these, a squadron of starships stands ready and back in the depths of the screen hover a jumble of jagged asteroids. And all this is just the static part of the display!

When the action starts, the stereo effect of depth really springs to life. As well as being able to control the up and down movement of your own ship and fire deadly laser beams across the screen, the novel feature of 3-Deep Space is that you can actually zoom your ship *into* and *out of* the screen.

But 3-Deep Space is not just a game with a new gimmick, it's also a classic game in its own right. For starters, you've got an extra dimension to move in and out of. Then you are assailed by wave after wave of alien ships.

First comes a wave of Meteor droneships, easy to hit but low for scores. If you manage to avoid crashing into these, a wave of high-scoring starcruisers follows. There are four different ship types with their own particular scores and as well as having to avoid crashes, you must stop *all* the deadly Dragon class ships from reaching your edge of the screen. To help you in this task, you're provided with four exterminator bombs — X-bombs for short — which can wipe out every alien on the screen.

Survive this wave and you gain an extra X-bomb but another wave of meteor droneships and then another wave of starcruisers are on their way to test your reflexes.

Programmed and designed by Mike Singleton, who also developed the 3D games in this issue, for Postern Personal Computer Software, 3-Deep Space may only be the first of a flood of stereoscopic games to hit the micro shops but it will certainly take some beating.



RIDE THAT OSTRICH INTO BATTLE

JOUST

Can you face the challenge of jousting with the King's champion?

This joust is a copy of the arcade game of the same name. And if you've played it you'll know that you ride an ostrich and battle against the opposing vultures. Try to kill them with your lance, but even when they are dropping from the skies as a final gesture a dying vulture will drop an egg to the ground or into the swamp. These eggs must be destroyed quickly or a new vulture will hatch out.

With nine skill levels the game will be able to cater for the beginner or the best in the land. The game for the 16k Spectrum is pure machine code and has hi-res colour graphics.

Rabbit, the makers, say that Joust is one of their new generation of computer games that are much more sophisticated, complex and challenging.

Joust will be available from Rabbit Software, the North London-based company, in early September when you can test out their claims for £5.95.

FIND THE DOCTOR AND RUN!

ESCAPE

In their bid to become the top software suppliers for the BBC machine, Micro Power of Leeds have announced three new games — and all are a departure from the tried and tested shoot-em up.

Escape from Moonbase Alpha is a fast paced adventure with 3D graphics, from the author of the much acclaimed Killer Gorilla. As in all adventure games you must collect treasure — but the main object of your mission is to rescue the lost Doctor and get off the base. But there's much more to the game than we can tell you here.

Also available in the company's Program Power range are Demon Decorator, an Amidar-style arcade game, and Danger UXB in which the player has to defuse TNT time bombs while avoiding other deadly dangers. All three games need 32k and cost £7.95 including VAT.

THE LOST TREASURES OF THE PYRAMIDS

TUTANKHAM

A boy's best friend is his Mummie — unless it's chasing him through a pyramid. You are stalking through the maze-like interior of a pyramid looking for loot when you are suddenly set upon by man-eating spiders and killer-mummies.

Tutankham is a Pac-Man type game with a slight difference. There are about 100 different mazes to get through, each one becoming more difficult as you strive to collect the ancient treasures and avoid the baddies.

To break into a new maze you have to pick up keys which appear at random and insert them in a door at the edge of the maze. Once in your new maze the monsters appear from behind a smoke screen.

Your only protection is a gun which unfortunately will only shoot horizontally — so watch out for baddies bearing down upon you. Should you get cornered you have one last device. Use your smart bomb and exterminate the lot of them.

Tutankham is controlled either by keyboard or joystick and is available from Surrey-based Micromania for the 48k Spectrum at £5.95

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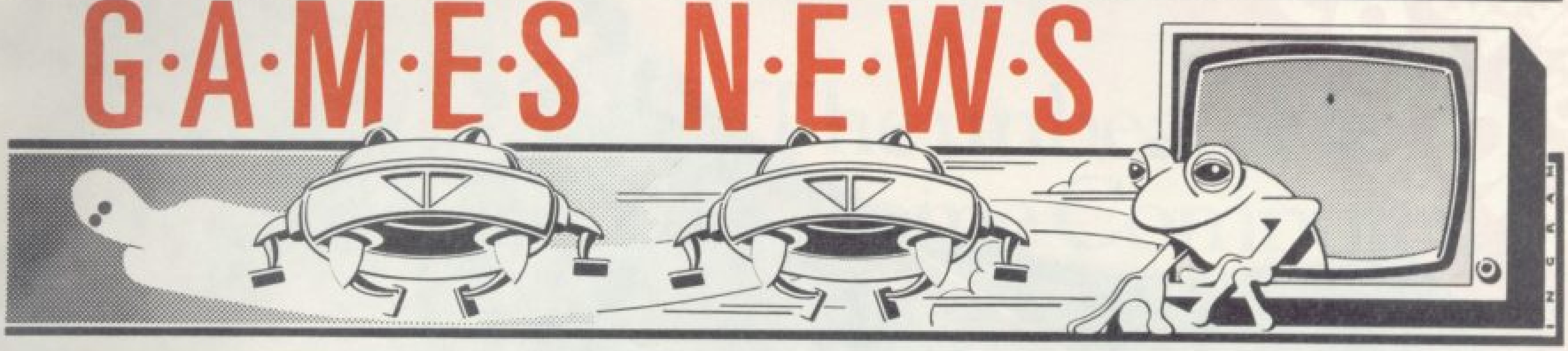
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G·A·M·E·S N·E·W·S



ALICE JOINS THE VIDKIDS!

ALICE IN VIDEOLAND

We've already told you about the show stopping graphics featured on Audiogenic's soon to be released disc-based game for the Commodore 64 Alice in Videoland. Well now we've got hold of some exclusive screen shots from this stunning graphic fantasy thanks to our friends at Audiogenic in Reading. You'll not see them in any other magazine.



One of the marvellous displays in Audiogenic's new game.

Alice, which is currently being programmed in Los Angeles, is expected in this country during September. It breaks new ground in graphic quality — as you can see in these shots from the game. The characters from the Alice stories illustrated in the game rival those original drawings found in the books. The backgrounds are pretty good too!

As for the game we can't really tell you much about it yet. Suffice to say that one of the screens has Alice crashing down the rabbits' hole — you have to stop her hitting the sides of the long tunnel.

Prices have yet to be confirmed but you'll be unlikely to find Alice in the shops for under £30. *C&VG* will be first to bring you more details of the game when we get them — just like we were first with these great screen shots!

Remember *C&VG* is always first with the news!

PREHISTORIC GAMES FROM THE USA!

QUEST FOR TIRES

Californian company Sierra-on-Line are developing a series of games based on the characters from the cartoon strips "B.C." and the "Wizard of Id" created by award winning cartoonist Johnny Hart.

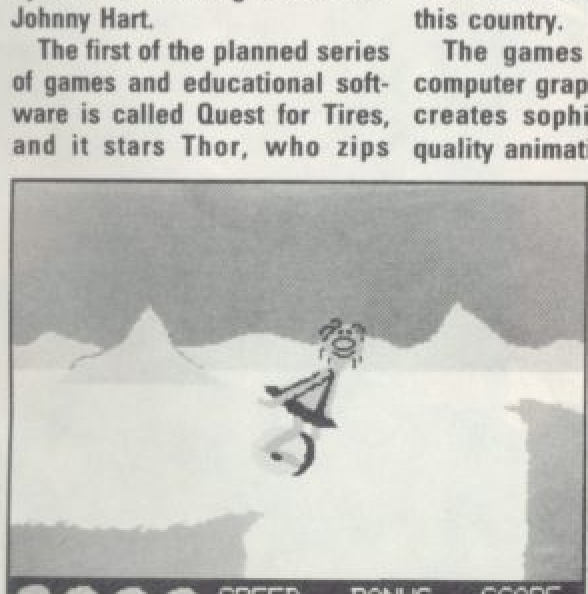
The first of the planned series of games and educational software is called Quest for Tires, and it stars Thor, who zips through the world of B.C. on his prehistoric unicycle. Thor has to rescue his girlfriend, the Cute Chick, from the claws of a fierce pterodactyl. But first he has to make it through 30 screens.

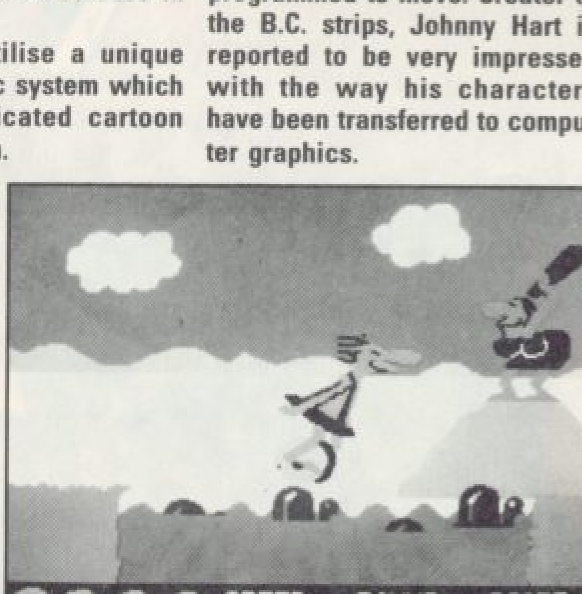
The games will be available within the next 18 months for the Atari, Apple, Commodore 64 and the ColecoVision. Quest for Tires will be available for these machines by Christmas in the U.S. but as yet there is no information about their release in this country.

The games utilise a unique computer graphic system which creates sophisticated cartoon quality animation.

After the cartoonist draws his character the drawing is placed on a bit pad and traced with a light pen. The image is then projected on to a screen by digital code. This allows the programmer to see what the game looks like before it is programmed.

Colours are added with the light pen and then the background is drawn in. The image is then put into the computer and programmed to move. Creator of the B.C. strips, Johnny Hart is reported to be very impressed with the way his characters have been transferred to computer graphics.





TED MEETS A SLIPPERY CUSTOMER

TEDDY

If you go down to the woods today you'll get a big surprise. All the Teddy-Bears will be ignoring their packed lunches and playing the latest maze game!

Teddy brings a whole new dimension to the Teddy-Bear's picnic. Before the bears can sit down to enjoy their grub the bravest of the bunch has to clear the forest of bear-eating snakes.

The screen displays trees, flowers and a lake forming a maze through which the bear must chase the snakes. They can only be caught by their tails — the other end has a habit of eating Teddies, so handle with care.

Teddy runs on the Vic-20 and comes from Audiogenic of Reading at £7.95.

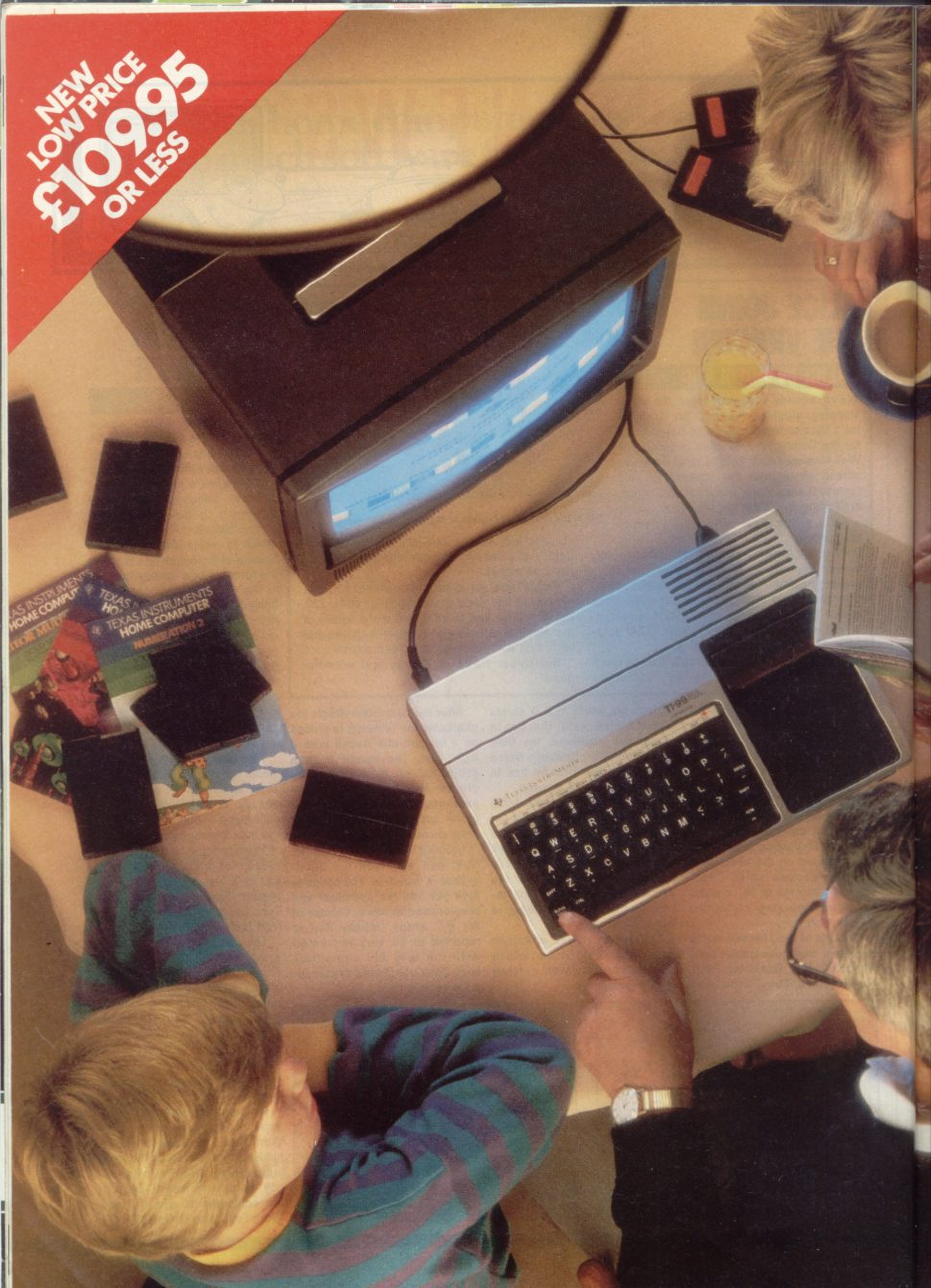
Also new from Audiogenic this month is a game called Road Toad, which as you've probably already guessed is a Frogger style game — but this time it's for the new Commodore 64.

The Toad has to cross a busy road to reach his home. The first half is a highway similar to the regular Frogger game — the Toad has to avoid traffic coming from both directions.

The centre lane of the road is a safe area for our warty friend — safe that is until an ambulance, police car or fire engine roars along on a mercy mission.

Once across the first lane the Toad game takes a new twist. He must get across the next part of the highway by jumping on top of passing cars. Road Toad will set you back £8.95.

Also for the 64 from Audiogenic is a word game called Word Feud. You have to find the hidden word hidden by the computer among a host of other decoy words and letters. Take on the computer or play a friend. Word Feud also costs £8.95.


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The TI Home Computer has got the memory power you might expect from more expensive computers, built in. At its heart is a powerful TMS 9900 16-BIT Microprocessor. Most other home computers have only an 8-BIT. And you can expand the memory from 16K of RAM up to 52K.

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Another feature that makes the TI system so powerful, yet so easy to use is Solid State Software.™ These plug-in cartridges cover everything from space games like Parsec™ to teaching maths, managing home finances and composing music. And the range is getting wider all the time.

It even has what professionals look for in a home computer

CPU: TMS 9900 16-BIT, plus 256-byte Scratchpad RAM.
Memory: Total 114K bytes; 26K bytes ROM internal; up to 36K ROM cartridges external; 16K built-in RAM expandable to 52K bytes.
Keyboard: 48 Key QWERTY, alpha lock, function key auto repeat.
Sound: 5 octaves, 3 simultaneous tones, noise tone.
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Interfaces: Cassette, TV, 2 joysticks, main peripheral port.

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More than one programming language

The standard programming language, TI BASIC, is built into your TI Home Computer so you can begin programming right away. But there's an expanded range of optional languages like Extended BASIC, TI Logo, USCD-Pascal, TI FORTH and Assembler.

With these you can fully expand your programming skills.

A wide range of peripherals

Most computers lose a lot of memory when you add peripherals. The TI Home Computer is different. Every peripheral comes with its own built-in programs to keep the loss of memory to a minimum.

The convenient Peripheral Expansion System houses up to eight peripherals. Additional hardware cards simply plug in. You can even add a complete Floppy Disk Memory System.

The peripherals include memory expansion, RS232 Interface, P-Code card and more. There's also a sophisticated matrix printer and Solid State Speech™ synthesizer – which you can use with your own TI BASIC programs.

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HALL OF FAME

G·A·M·E·S N·E·W·S



THOSE ALIENS JUST NEVER GIVE UP!

INTERDICTOR

Flying through the galaxy you find yourself under attack from a wave of murderous aliens. Not again you cry!

Armed with photon torpedoes and lasers you launch into battle. Take aim carefully — your lasers will score immediate hits but the photon torpedoes have to be fired ahead of the moving target to destroy an alien.

In this space action simulation game you are a sub-lieutenant in control of a spaceship travelling from starbase to starbase throughout the galaxy.

You have a video screen on the bridge and you can see just what is going on outside the spacecraft. The screen is surrounded by control panels and instruments.

The aim of the game is to successfully fight off alien attacks and safely dock with a starbase to refuel. At each starbase your rank is evaluated and if you were successful you may be promoted. The highest rank to be gained is Commodore.

It isn't as easy as it sounds as when you reach the locale of a starbase your spaceship has to be manoeuvred through a tunnel — the only way to get through the starbase's protective shields unscathed.

Should you deviate from the tunnel, the starbase's lasers will probably blow you up. You'll be demoted for losing a ship!

Interdictor Pilot, from Molimerx of Sussex, comes complete with a flight manual and has keyboard control. It is available for the TRS-80 Models 1 and 3 and for the Video Genie Models 1 and 2 on cassette at £13.00 and disc at £15.50+VAT.

Also available from Molimerx is Airbus, a sophisticated flight simulation game. This is available for the TRS-80 Models 1 and 3 and the Video Genie Models 1 and 2 on disc at £17.00 plus VAT.



Illustrations: Jon Davis

BEWARE THE KAMIKAZE SPIDERS. . .

PYRAMID

Take the plunge and explore the mysterious chambers of an unknown pyramid.

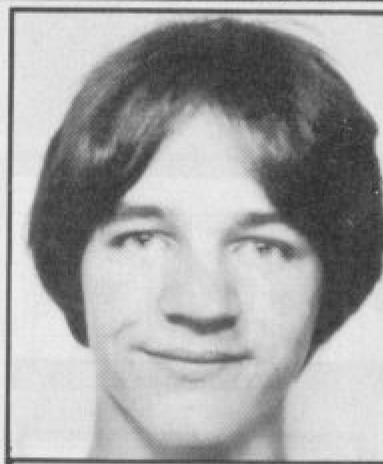
While taking an early morning ride in your space capsule you find yourself hovering over the top of a pyramid. Suddenly you notice an entrance and, in a fit of madness, you decide to explore!

But aliens lurking in the chambers of the pyramid don't take kindly to intruders. You will be set-upon by baddies of every conceivable shape and form, including monstrous flapping bats and horrible spiders. Watch out as they try a kamikaze leap, killing themselves as they fly and jump onto you!

The aim of Pyramid is to reach the inner sanctum and find the nature of the treasure and the name of the long-dead queen buried there.

This isn't as easy as it sounds with 15 levels to the pyramid, up to 60 types of aliens to zap and 120 chambers to get through. To make your journey even harder, the inner sanctum can only be reached by one of many different routes.

Pyramid is available from Gloucester-based Fantasy Software Ltd, formerly Quest Microsoftware, for the 48k Spectrum at £5.50.



MANIC WINNER!

Why is this man smiling? He's just become the first person to discover the secret of Manic Miner that's all! Jim Wills completed all twenty screens of Bug Byte's latest offering for the 48k Spectrum.

Jim, pictured here, had only completed 15 screens of the massive game. Then he read our review in *C&VG* and learned of the prize on offer for the first person to complete the game. He dug out his cassette again and finished the remaining five screens in just one afternoon!

Jim will win a new colour TV to use with his Spectrum, and you should be able to catch him at this year's Personal Computer World Show where he'll be displaying his talents and offering a challenge to other Manic Miner freaks.

If YOU have completed the game then you should send details to Bug Byte in Liverpool. Tell them your name, address, phone number and score. And don't forget to tell them the secret!

You'll be invited to play again to prove that you really can finish the game, and there will be prizes for the fastest players. The presentation should take place around Christmas time. Meanwhile, does anyone out there know how to get past the Mutant Telephones?

CRUSTACEANS LURK IN OUTER SPACE

LUNA CRABS

Luna Crabs and Haunted Hedges are two new 3D-style arcade games for the Spectrum.

These two all-machine code games are carefully constructed to achieve the correct 3D perspective and push the Spectrum's graphics capabilities to the limit, according to the manufacturers Micromega.

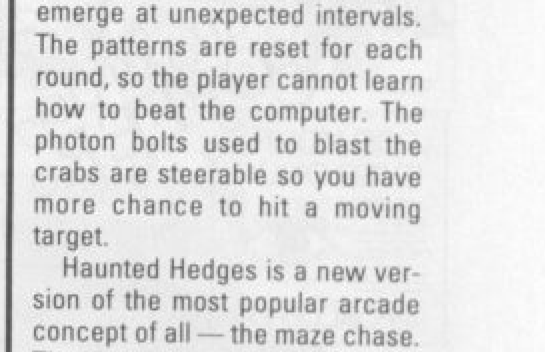
Luna Crabs returns to the essential simplicity of the classic arcade games. The crabs behave semi-intelligently, swarming and bunching in changing patterns, and hiding behind hills to re-emerge at unexpected intervals. The patterns are reset for each round, so the player cannot learn how to beat the computer. The photon bolts used to blast the crabs are steerable so you have more chance to hit a moving target.

Haunted Hedges is a new version of the most popular arcade concept of all — the maze chase. The features include full 3-D visual effects.

An animated figure with arms and legs moving as it chases and is chased around the maze.

The intelligence level of the ghosts is included as a variable the player can set.

Full instructions are included on screen, and again the controls have been simplified. A feature of the programming is that the player can chose which keys suit him best to control the action at the start of the game.




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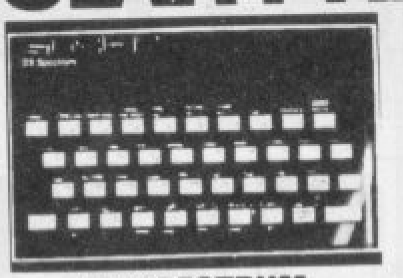
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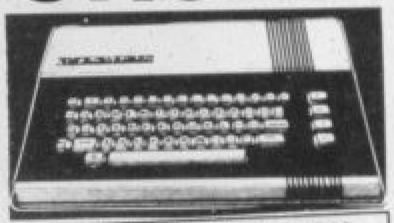
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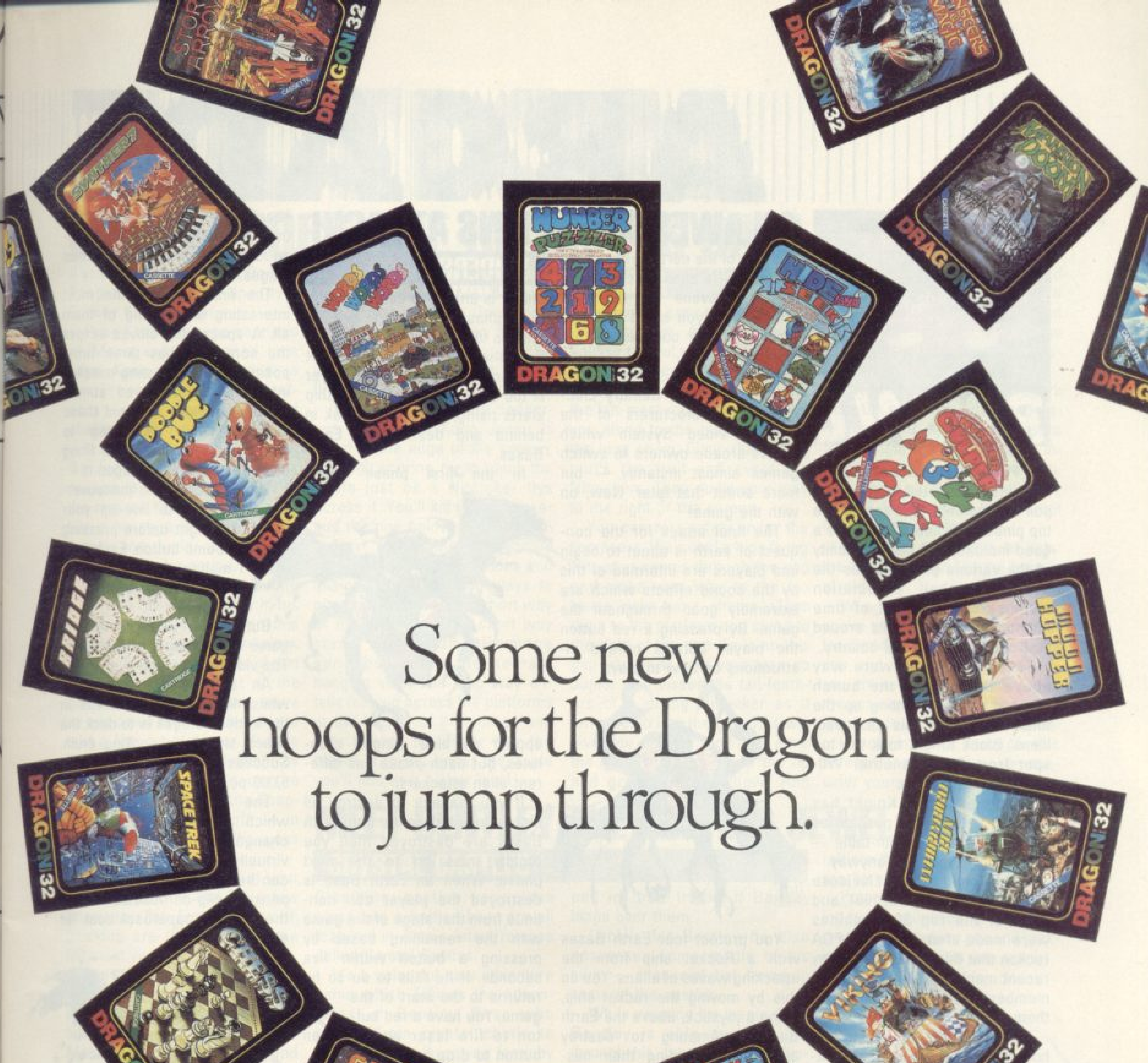
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Of course you don't have to be a grand master to play it, but, on level nine, you do need to be one to beat it.

Mind you, that's just one of nearly a hundred Dragon software titles available and, though they're all fun, they're certainly not all games.

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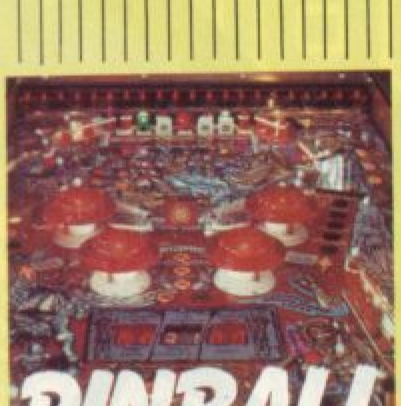
Another can teach you how to type.

And, although some of our other titles are displayed above, the best way of seeing our full range of software isn't by looking at this ad.

It's by going down to your local Dragon stockist.

DRAGON

ARCADE



PINBALL

The Pinball Owners' Association have just completed their annual poll of members to discover the top pinball machine of 1983. It's a good indication of the playability of the various pin-tables as the average pinball association member spends a lot of time hitting those silver balls around in arcades all over the country.

Three machines were way above the rest of the bunch when it came to totting up the final votes. And this year Williams' Black Knight took the top spot from Flash, another Williams-made machine.

That means the Knight has taken over the prime position as THE modern classic pin-table — according to the POA anyway.

Black Knight was first let loose on the arcade scene in 1981, and most of the top 30 machines were made after 1982. The POA reckon that this is because many recent machines are scarce and members just don't get to play them.

So you'll have to wait to see how the games we've been writing about in this column fare among the older machines. Meanwhile here's the POA's top five:

1st. Black Knight, Williams
2nd. Flash, Williams.
3rd. Eight Ball Deluxe, Bally.
4th. Haunted House, Gottlieb.
5th. Centaur, Bally.

Although Williams have taken the top two places in the chart, Bally are the overall top manufacturer with the largest number of machines in the top 30.

If you're a pinball fan then you must rush out and place an order for the *Computer and Video Games* Yearbook 1983. There is a whole page given over to the art of playing and collecting pin-tables. Plus some nice photographs of some vintage machines. It should be in the shops in time for Christmas. Don't miss it.

Illustrations: Jon Davis

AN AWESOME ALIENS ATTACK!

RAIDERS

The fate of the earth hangs in the balance. The aliens are massing in the heavens for the final attack. Only you stand between them and their conquest of our planet!

Raiders is the name of this latest game from Century Electronics, manufacturers of the Century Video System which allows arcade owners to switch games almost instantly — but more about that later. Now, on with the game!

The final attack for the conquest of earth is about to begin and players are informed of this by the sound effects which are extremely good throughout the game. By pressing a red button the player obtains printed instructions on how to play.



You protect four Earth Bases with a Rocket ship from the attacking waves of aliens. You do this by moving the rocket ship, using a joystick, above the Earth Bases attempting to destroy aliens and avoiding their missiles.

There are eight aliens and you score 250 points for each one destroyed. If the aliens destroy all four Earth Bases then the player is unable to contine to the next phase and there are 16 phases to get through before the final phase. There is a time limit for each phase and if the player is too slow then the Rocket Ship starts rising, the aliens sneak in behind and destroy the Earth Bases.

In the first phase aliens



appear as blue winged creatures, but each phase has different alien attackers.

If you manage to destroy all eight aliens before the four Earth Bases are destroyed then you rapidly pass on to the next phase. When an Earth Base is destroyed the player can continue from that stage of the game with the remaining bases by pressing a button within five seconds. If he fails to do so he returns to the start of the game. You have a red button to fire laser and a green button to drop bombs.

I found it almost impossible at first to get past the first phase.

However, by ignoring the aliens and concentrating instead upon dodging the missiles and by keeping my laser finger glued to the fire button I eventually managed to pass through the various stages.

The final stage is the most interesting and testing of them all. A space ship moves across the screen. It has three firing positions, each blasting missiles into the star clustered atmosphere. You have to avoid these missiles while attempting to bomb each of the three firing positions. I never managed it.

The difficulty is in manouvering your craft to line up your bomb sight before pressing the bomb button. Each time I managed to get close I was destroyed by an alien missile!

But that's what made the game so exciting and absorbing. The video aliens won every time!

An additional points scorer whilst fighting off the aliens in the various stages is to dock the space ship to a docking drum. Success in this manouvre gains 5,000 points.

The Century Video System, which allows instant game changes and is so flexible that virtually any game or novel effect can be incorporated, uses inexpensive clip-on modules about the size of a paperback book for each game.



NOW THE FORCE IS WITH YOU!

STAR WARS

The latest arcade fantasy from Atari plunges the player head-on into the world of Luke Skywalker and his friends.

Star Wars, probably the most phenomenal movie entertainment in recent years has exploded on to the arcade scene.

The force of the powerful new video game assaults the imagination visually with graphic simulation and special features that include music and dialogue created from the movie.

The player becomes Luke Skywalker at the controls of an X-Wing fighter and enters into the epic confrontation with Darth Vader and other Galactic Empire agents. He commences battle by selecting a Death Star level — ranging from easy to hard.

Once he has rid himself of Empire fighters, the player is suddenly confronted by Death Star which looms ahead on the screen. He flies in towards the surface of the planet and discovers a battlefield of laser towers and bunkers.

If he can manoeuvre through this heavily armed field, the player can commence his attack run and attempt to blow up the Death Star by firing one shot into a tiny exhaust port — just as in the first Star Wars epic. But, he must first fly through a trench bristling on either side with laser cannons.

Finally, at the end of the trench, the exhaust port appears, but only fleetingly. Quick reaction is required from the player to fire a proton torpedo. If his aim is good, he is hurled back into space before the explosion of the Death Star consumes the screen.

Playing the game is almost as good as watching the movie!

JUNIOR GOES ONE UP ON HIS DAD!

TIPS ON DONKEY KONG JUNIOR

If you went bananas over Donkey Kong then you'll go ape over Donkey Kong Junior!

Papa Kong has been captured by Mario and imprisoned in a cage. Kong junior has to save him. The road to rescue is hazardous — with many and varied challenges to overcome.

It all starts with the Hanging Garden screen — Junior's answer to the Ramp screen of the original. Kong Senior is captive in his cage at the top of the screen and Junior waits at the bottom ready for action.

You must help Junior swing from vine to vine to reach his father. Junior's enemies on this screen are two forms of Snapjaw.

Blue Snapjaws slither down the vines and then out of the game. Orange Snapjaws move up and down the vines burning to take a bite out of Junior. But the little ape can defend himself by sending fruits hanging on the vines whizzing down at the Snapjaws to knock them off — in much the same way as the rocks operate in Dig Dug.

On this screen go out of your way to grab fruit and kill a few Snapjaws. The first fruits worth plucking are the pears on the left-most vine.

The toughest part of the screen is jumping up to Mario's platform. Move the joystick to the left while hitting the jump button. Make your way to the key and watch in horror as Mario moves Papa Kong and the cage away to another screen!

Just one thing — when you're climbing hang on to two vines.

Then you're on to the chains screen — similar to the Rivet screen in the original Kong game. Each chain has a lock positioned at the top of it. Junior must push keys up the chains to unlock the bonds that bind his big daddy.

On this screen the Snapjaws are joined by Nitpickers — video birds which fly across the screen, starting at the top, and descending Zig Zag fashion. Snapjaws move up and down the chains. Contact with any of these is, of course, deadly.

Once you've unlocked all the locks the entire edifice comes tumbling down and you get a quick graphic display before the next screen appears. One important rule for the chain screen: You should always open the locks on the outermost chains first.

They are never more dangerous than when Kong Junior is close to the edge of the screen. For high scoring try to pluck the apple just as a Nitpicker flys across it. You'll kill this Nitpicker and the one below it.

Next comes the springboard screen which features vines and chains. There are two ways to play this screen — the short way or the long way. The short way starts with a jump from the springbouard to the nearest hanging vine. The long way entails leaping across the platforms at the bottom of the screen and then moving up. Either way the object is to get under the apple you'll find at a higher level.

Timing is critical if you take the short cut. And you'll need finesse to deal with the long way — so take your pick! When you reach the moving platform grab the left-most rope and let it carry you along to the platform under the long chain. Climb the chains pluck the fruit and avoid the Nitpickers. Then make your way to the right of the screen.

You can rest safely under the two pears. Wait until a high flying Nitpicker comes through the gap and make your way to the extreme right hand chains. Climb them to the platform and stand to the right of the gap. To jump this gap you must time your leap so Junior just misses the tail-feathers of a diving Nitpicker as it turns down into the gap. This will give you time to land and jump the next Nitpicker. Jump the up and grab the key. Phew! And there's still one screen to go!

The final screen, Mario's Hideout, is a wierd and wonderful affair. It looks as if the mad carpenter has taken refuge in a sewer! But don't be deceived this is the hardest screen of the game. New enemies are introduced called Sparks.

These are similar to the Sparx from Qix and travel independently about the pipes of the maze threatening Kong Junior with instant electric death. The little ape can destroy them with the faithful fruits which hang from the fixtures and fittings.

Otherwise he'll have to jump the Sparks — just like the barrels of old.

Whenever you jump a Spark you're going to have to watch out for Sparks on the pipes above you and those behind the one you are jumping. Get to the top of the screen as quickly as possible ignoring fruits and bonus points.

If you make it through this screen consistently you can consider yourself a genius!

MEET BENTLEY THE BAFFLED JEWEL THIEF . . .

CRYSTAL CASTLES

Gleaming castles, priceless gems and a baffled bear are all featured in Atari's latest release called Crystal Castles.

It's a colourful new adventure game which follows the adventures of Bentley Bear who travels from crystal castle to crystal castle searching for ruby gemstones. There are secret ramps, elevators and passageways, and players who discover secret time warps gain access to more advanced levels of play.

Bentley's path through the crystal castles is lined with ruby-paved roads but gathering jewels is dangerous. Hungry Gem Eaters which greedily gobble Bentley's treasures, there are scary trees which chase him and giant crystal balls intent on running him down. Bentley's arch-enemy Berthilda the Witch is also out to get him. Berthilda comes to life every fourth wave. Once at her castle, at her fortress, at her palace and then her dungeon.

The Gem Eaters, caterpillar-like creatures, are harmless and can be knocked out of the picture while they are swallowing gems, but they are deadly at other times. Trees can be stopped in their tracks if Bentley leaps over them.

Luckily for Bentley he also possesses some magic of his own — a special hat found in some of the castles.

While wearing his magical hat Bentley is able to run right through his opponents and temporarily dispose of Berthilda.

But, the magic of the hat wanes, and when it disappears so does Bentley's protection.

As a special treat for the Bear there is also a pot of honey, but a swarm of bees appear every few seconds to protect it.

Bentley can gain points by grabbing the honey, but getting surrounded by a swarm of bees means curtains for him.

There are ten levels of play featured in Crystal Castles, four castles or playfields per level, all in contrasting colours, and there are 16 playfields in all.

Adding a magical touch to the game's cabinet is a special glow-in-the-dark track ball.

The Crystal Castles Hall of Fame holds the initials of 250 high scorers, and there is a special honour in store for the player with the highest score — his initials become "engraved" in the first castle.

Points are scored by collecting gems, eliminating Berthilda, grabbing the honey pot and picking up the last gem per wave.




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ACCESS

Eddie Mitchell's letter about the prices of Atari software sparked off a great debate among owners of this versatile micro. Here at the *C&VG* offices we've received many letters agreeing with his comments. So we decided to look further at that subject which is obviously close to your pockets!

Dear Sir,
Reading Eddie Mitchell's comment on the highly priced Atari 400/800 software, I find myself in a similar position of having a great machine and not being able to afford the advertised programs.

However, through this demand a few software hire clubs have sprung up recently, giving us a chance to sample the previously forbidden fruit for hire charges of approx £3.50 a fortnight.

What has become apparent is the fact that although these are excellent examples of programming and they exploit the Atari machines to the fullest, they lose their appeal after a while, being almost demo programs for interested visitors to my house.

I feel that as more and more Atari owners hire software, they will be more selective about where that £29.99 goes, whereas if they only were spending £10-12 on a program, their shelves would fill up with seldom played games.

In short, all you software houses out there are cutting your own throats by selling Atari progs at £25.00 plus, because its only a matter of time until local programmers get to grips with a range of games, utilities etc at realistic prices.

Geoff Redburn,
Milton Keynes,
Buckinghamshire.

Dear Sir,
Referring to Mr. Mitchell's letter in your last Mailbag I fully agree with his comments on expensive Atari programs. I have owned my Atari 400 for approximately two years, still having purchased only two programs due to inflated prices compared with other machines.

If Atari do not pull their socks up soon on prices, it will be soon overtaken by future new hardware at lower prices. Most computer magazines have plenty of programs for many makes of computer but very little for the Atari.

J. A. Thompson,
Bognor Regis,
Sussex.

Dear Sir,
Admittedly Atari produce very good computers, and now that their prices include the basic cartridge and in some places you also get a free Pac-Man cartridge, they represent far better value than a while ago. The games are of a high quality, but my grumble is that they are so expensive.

I can understand £30 for a cartridge as they are more expensive to produce, but when you get cassettes selling for £20-£30 it's a bit too much for my 1k brain to handle.

Two software houses that produce Atari games cartridges or tapes that are high quality and actually affordable are Llamasoft — who produce the excellent Gridrunner for the Atari at only £7.50 — and English Software which produces games for £14.95.

Jason Brown,
Malton,
N. Yorkshire.

Dear Sir,
I have observed with interest other readers recent comments regarding the capabilities of the Atari 400 vs. others.

I will endorse the fact that the Atari 400 is undoubtedly the best "under £200 home micro", but for how long?

The trouble with Atari is they have drastically reduced the price for the 400 (much to my chagrin — I paid nearly £400 for mine two years ago) but their software, although definitely of the best quality, is still astronomically priced in the UK compared to prices in the USA.

Several prospective micro buyers who I have contact with will not buy an Atari because of the high cost of the software.

I suggest that if Atari wish to maintain their top position in the UK they ought to closely examine their games prices and reduce them to something compatible with the cost of the computer.

Eric Bacon,
Worksop,
Nottinghamshire.

First we turned to Philip Morris of the English Software Company, major UK producers of homegrown software for the Atari. He predicted that the price of home-produced software would come down to around £10 after Christmas.

"It won't come down to Spectrum software prices, there's just not the market at the moment. But the general trend for home produced products is downward."

Jeff Brown, of Centre Soft, the biggest importer of Atari software in this country, said that the price of products for this machine in the UK is linked with the price in the States.

"For the past two years we have been the biggest importer of Atari software, with the largest range of titles and in that time the American prices have not changed."

He said that the prices are so stable as Americans have more disposable income and the price of an Atari tape or disc does not make such a dent in their pockets. So the price of software in the States stays high — and that price has to be reflected here.

Jeff encouraged Atari owners to take a look at software prices advertised in American magazines and then compare them with what is being asked in the UK.

Then you must take into account the costs of shipping the products over, add on VAT etc. "There are no rip-offs along the line. We are cutting margins very fine to sell Atari products over here at the same price as in the States," Jeff added.

"We actually brought in a line of budget software from the States which sold at £11.95, but surprisingly there was a lot of customer resistance to it."

He reckons that Atari owners, who have a machine which can produce "state of the art" graphics, are not interested in buying products which don't make the best use of their computers' capabilities. They would rather buy fewer more expensive items than cheaper software which can't match it for quality.

He couldn't offer a glimmer of hope for British Atari owners on American import prices but he did add: "There's no reason why British software shouldn't be cheaper."

Access is planned to be an irregular feature in *C&VG* and will deal with issues that concern you, our readers. Issues that we can't fit under the Great Software Disasters category. Why don't you drop us a line if there's anything bothering you? You'll find our address elsewhere in the magazine.

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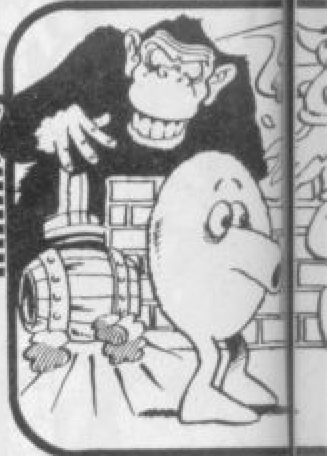
Scrambler	M/C	£5.00	Munch Man	M/C	£5.00
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VIDEO



HAWKS OF TERROR!

Terror Hawks will explode onto our screens at the end of the month.

From the man who brought you Thunderbirds this is the latest all action space adventure set for a prime time viewing slot at 5.30 on Saturday evening.

Gerry Anderson's puppets first achieved international fame when characters like Jeff Tracey, Brains, and Lady Penelope had an earlier generation of space fans glued to the screen every Saturday morning.

Now a new generation of space fiction addicts can enjoy the adventures of these sophisticated puppets.

The good news for Phillips G7000 owners is that a new Videopac based on the TV series will be launched at the same time.

Just like the programme itself there is plenty of action, fighting it out in deepest space with an alien empire.

Also new from Phillips this month is a teach-yourself Morse Code Videopac.

The games are in the shops at £13.95.

SUMMER SHOW

If you get up to Blackpool this summer why not go along to the Daily Star/Radio Luxembourg Roadshow at the Pleasure Beach. The roadshow is being sponsored by CBS Colecovision and the full range of Coleco's video games will be on hand for visitors to try out. So if you are fed up with the beach or bored with eating too much candy floss, why not go and enjoy a 3D shoot-out on Zaxxon or take on Mario in Donkey Kong. For videogames fans it sure beats sunbathing!

BUY-BACK!

A brand new "buy-back" scheme has just introduced a unique way to play the latest games for the VCS and Intellivision at a fraction of the cost of shelling out around £30 each month to keep up with the new titles.

The scheme is based on the Buy-Back Certificate which is included with each purchase of a new game.

If after 28 days of play you have tired of the game, you can send it back to the schemes organisers who will accept the returned cartridge as 80 percent of the purchase price of your next choice.

The scheme is operated by Horton-Carlyle Limited, of London.

An average game priced at £30 will be bought back by the firm at around £24 — adding up to hire cost of £6 for the month.

MATTEL FOR THE ATARI

Mattel are launching a range of games designed for the Atari VCS system. Mattel say that they aim to bring bolder graphics and more challenging games to owners of Atari units. We wonder what Atari thinks about that! There will initially be nine cartridges available, including Intellivision favourites Burgertime, Tron, Deadly Discs, Lock n' Chase, Adventures of Tron and Frog Bog. They will cost £9.95 each.

YET MORE POWER FOR THE VCS

Add computer power to your Atari VCS with a brand new computer keyboard add-on which turns your games machine into a programmable home computer.

The machine is designed by SpectraVision of Planet Patrol and Nexar fame and imported into the UK by Vulcan Electronics.

It has 2k of Random Access Memory for you to write your own programs, and there is 16k of ROM controlling the computer's other functions.

Other special features include a built in music composer with two octaves and two channels which enables you to program your own music which can be replayed through the VCS.

Game writing is facilitated by means of the Magic Easel mode which is built in and enables you to draw in up to ten colours on screen. Programs can be stored on any normal cassette recorder.

The add-on uses the Microsoft computer language — Basic, which is standard to most home computers.

SpectraVisions CompuMate should receive a boost now that Atari have decided to scrap their own keyboard for the VCS due to pricing problems.

NEW FOR THE COLECO

Spectravision have announced a range of new games for the Colecovision. The highlight of the four titles is Super Cross Force, a new version of the successful VCS game.

The game is unique in the shoot 'em up category and challenges you to shoot a connecting beam of laser fire to kill the aliens.

As you move the bottom ship left the top ship moves right making a diagonal line of fire when you press the red button.

Three other new titles will go on sale for the Colecovision at the end of September.

The Spectravision range for Coleco are imported by Vulcan Electronics of Hendon, in London and will be ten pounds cheaper than Coleco's own range — retailing at £19.95.

CAUGHT IN THE WEB

Web Warp challenges you to capture the space creatures and take them through the secret door deep in space to the Trophy Room where they are proudly displayed.

The maximum number of creatures you can capture is twenty, though you will have to be a real space ace to do this as it has so far eluded everyone including the games designers.

To capture the aliens you are armed with a capture stick which you can flick out at the aliens by depressing the fire button.

Web Warp is one of six new games for the new Vectrex machine from Milton Bradley.

Other highlights in this batch of new releases are Narzod — a second 3D style shoot 'em up where you have to advance up through a twisting tunnel, defeating the waves of aliens that are attempting to thwart your progress.

Spike is the first game from Vectrex which utilises the speech synthesis built into the machine. It has to be said, however, that Vectrex's vocabulary is fairly limited, and the few words that are spoken have to be illustrated with comic-book style speech bubbles so that they can be understood. The game itself is based on Donkey Kong — the evil Spud has captured Molly and its you to the rescue.

Also in the range are versions of old favourites Pinball, and Soccer.

The first Vectrex add-on will go on sale at the same time as the new games in the shape of a light pen. This can be used to create simple moving pictures of up to nine frames.

There will be a second more powerful animation package available later in the year. This will enable more frames to be fed into the Vectrex thus facilitating more movement, and also using a number of pre drawn background landscapes.

Musical Vectrex owners have also been thought of in the new releases as Milton Bradley are developing a program called Melody Master which enables you to compose music on screen with use of the light pen.

The new games will be on sale at the end of September £19.95.

Vectrex are determined that they will not allow any independent companies to produce games for their machine.

TOP TEN

GAME	MANUFACTURER	GAME	MANUFACTURER
1 Donkey Kong	CBS	6 Ms Pacman	Atari
2 Centipede	Atari	7 Pitfall	Activision
3 Pheonix	Atari	8 Frogger	Parker Bros.
4 Vanguard	Atari	9 Space Invaders	Atari
5 River Raid	Activision	10 Burgertime	Mattel

All the above cartridges are produced for the Atari VCS home video games centre.



GAMING

SEE ATARI CHAMPIONS AT PLAY!

PLAYERS OF THE YEAR HEAD FOR MUNICH

Stuart Murray from Aberdeen is the under-18 National Atari player of the year for 1983.

There were over 60,000 entrants this year. These were reduced in six regional heats and finals to just 54 competitors who met at London nightclub, the Camden Palace one Saturday in August.

They had played Phoenix at local level, Ms Pacman in the national heats and the new Centipede game at the national finals in London.

Compere for the afternoon was Keith Chegwin, of TV's Swap Shop fame.



Andrew Brzezinski — over 18 champion.

The heats were played in groups of eight with each contestant given ten minutes to clock up a record score on Centipede. Most finalists had brought their own well-seasoned joysticks, although this didn't always seem to help.

Once all three lives were lost you weren't allowed to start again and many players found themselves being escorted from the stage in tears after only three or four minutes.

This was usually put down to nerves, but may also have been due to Keith's jokes which could have put many people off their game while they tried to remember how old his script actually was.

Eventual winner of the over-18 section was 19-year-old Andrew Brzezinski from Greenford, Middlesex with a score of 197,860 in the fifteen minutes given to the final 16.

Andrew takes away an Atari 800 computer complete with software, a winners' jacket and a ticket for two to Munich where he'll represent Great Britain in the Atari world championships later this year.

Last year the British champion also conquered the world at Pacman. Let's hope that we can make it the double. This year the world championship game will be Centipede.

Champion in the under-18 section was 14-year-old Stuart Murray from Potterton in Aberdeen. He clocked up an amazing 221,983 in his allocated 15 minutes, even though he's only been playing Centipede for just over a month.


Tik — or is it Tok?

Stuart, who reached the finals last year in Pacman, also receives an Atari 800 computer, a silver jacket and a ticket for Munich.

Stuart told me that he practices for up to four hours every day, and it certainly paid off. The continual Centipede-bashing hurts his fingers but he does special exercises to keep them supple.


Would-be champions.

His mum was obviously thrilled at Stuart's achievement but his dad was still in Aberdeen and hadn't heard the news when I spoke to Stuart.

I asked the champion what tactics he uses to get such massive scores. He told me that the main area where points can be made is for killing the spider. Most players kill the spider as soon as it appears but it's better to wait as long as possible — that way you get more points for killing it.

Stuart's other hobbies include basketball — but he doesn't do German at school so he'll have to start practising. Perhaps he should buy the Conversational German program to run on his new Atari computer.

His immediate ambition is to become world champion, and then he'd like to design video and computer games.

We all wish Stuart and Andrew the best of luck in Munich — we'll let you know how they get on.



Stuart Murray — under 18 player of the year.

Colour pics: Denise Shemuel

FAST FOOD FOR THE VID KIDS

The latest craze to hit video game crazy America is food based on your favourite video characters!

Not surprisingly, man of the moment Donkey Kong features in a brand new breakfast cereal of the same name.

The crunchy barrel shaped treats are the creation of the Ralston Purina Company of America who claim for their product "If you like playing Donkey Kong, you're gonna love the crunch of the new Donkey Kong cereal!

Not to be outdone by the ape the Franco American Food Company have hit back with UFOs — an assortment of pasta aliens including galactic interceptors, and star green cheeses. All you need now is a Pac-ed lunch!

ViSiONS

Stop press — Lightning Strikes

Visions have signed a major distribution deal with Prism Microproducts and Lightning Records to ensure that everyone has a chance to try their video games. Over 2000 retail outlets throughout the UK now stock Visions products — and there are more to come!



Jon Burnham

Chrome, Sweet Chrome

From the start, Visions took the decision that all their games would be reproduced only on chrome tape.

"This way" says Martin Parmiter, "we can ensure that our tapes have a lower failure rate than any others on the market."

"This is due to our unique tape reproduction facility developed from our previous company, Dataclone", says co-director Jon Burnham, who was actually responsible for the tape duplication machines.



Visions makes major breakthrough in video games war

Chiswick based Visions is moving into the video games market in a big way with a new range of exciting and radically different games.

The games, which include Pitman 7, Sheer Panic and Visions Snooker are being marketed by young company which a really major impa challenging worl

Visions managing director, Sean de Bray, explains: "We're using a new pool of highly imaginative young pro ers who are just bursting wi s for revolutionary dif-

constantly recruit eir gifts ial and e."



Sean de Bray





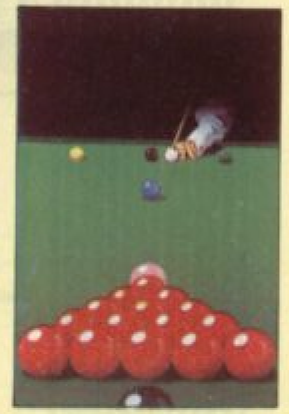
Visions

ARE BREAKING THROUGH THE INCREDIBILITY GAP

Visions **Pitman 7**. is just one of 3 new exciting games from Visions.
It takes you to the very depths of your imagination and maybe back again.
With two separate attack waves and three levels of play, only the strongest survive.
The weakest are doomed to a tomb. Pitman Seven. It's tough, it's challenging.
Visions **Pitman 7**. Like **Sheer Panic** and **Snooker**. They're games with a difference.
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SHEER PANIC VS-02-16


SNOOKER VS-03-1/4

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VIDEO





And, surprise, surprise, one of the best games in the Supercharger range so far is an Adventure called Dragonstomper — which comes in three parts. But more of that later.

The Starpath Supercharger is sold complete with a tape called Phaser Patrol, which we also feature in our Joystick Jury reviews section this issue. The Supercharger and Phaser Patrol package will set you back £39.95. Games tapes cost around £19.95. Now read on . . .

With the demise of Atari's 5200 super system more video games players will probably be turning to the Starpath Supercharger, a plug-in expander for the regular VCS, to improve the capabilities of their home video centres.

We gave you a rundown on the new Supercharger a couple of months ago — but for those of you who missed it here's a brief description of this Atari accessory.

It does more than the standard computer RAM-pack as it also enhances the colour and graphic capabilities of the VCS. The expander looks a bit like an overlarge games cartridge with a handle and plugs into the games port of the VCS. A lead connects it to a cassette recorder. The Supercharger games all load from tape, as do computer games.

The most impressive feature of the Supercharger is its multi-load facility. This enables several games to be stored on one cassette. This opens new vistas for graphic adventures on the VCS.

STOMP THAT DRAGON!

Dragonstomper is a classic adventure. It has hidden treasures nasty villains and an evil monster to overcome. The graphic displays are interesting but not overwhelming — which is a bit disappointing since other games in the Atari Starpath Supercharger range are pretty nifty on the graphics front.

The action — all important in an Adventure, graphic or otherwise — is substantial enough to keep your interest. And with three parts to this challenge you're sure to be playing for some time.

The biggest criticism I've got of this otherwise good game is the graphic representation of the hero. You are shown on screen as a small yellow blob! Not very inspiring. Come on Starparth you surely could do better than that'.

Meanwhile, on with the scenario. You take the part of the heroic Dragonstomper wandering a land devastated by an evil Dragon. Your task is to destroy the Dragon and restore peace and tranquility to the land.

There are three scenarios to work your way through. The first is the Enchanted Countryside, haunted by evil beings such as ghouls, demons, spiders and other assorted nasties. Dragonstomper has to travel the countryside collecting the gold, weapons and other items he needs to cross the bridge into the Oppressed Village.

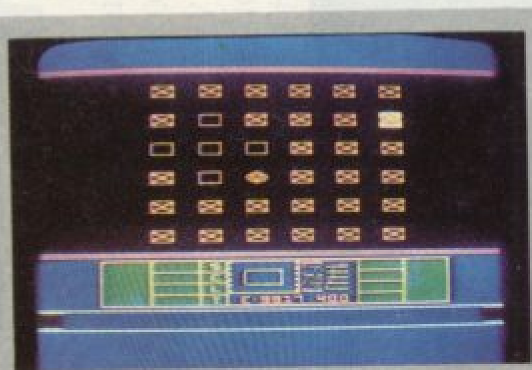
Once over the bridge — you'll have to have the right items to get past the guard — you enter the village.

This means loading the next part of the game from the tape — and an instruction to that effect flashes up on the screen. In the village you have to purchase or trade for the goods and weapons and magical tokens needed before you enter the final phase of the game, the Dragons Cave.

In the village you'll appreciate the need to gather together a good hoard of gold while in the Enchanted Countryside — those magic spells don't come cheap! Once you've spent all your gold it's off into the Dragon's lair — where things get really tough.



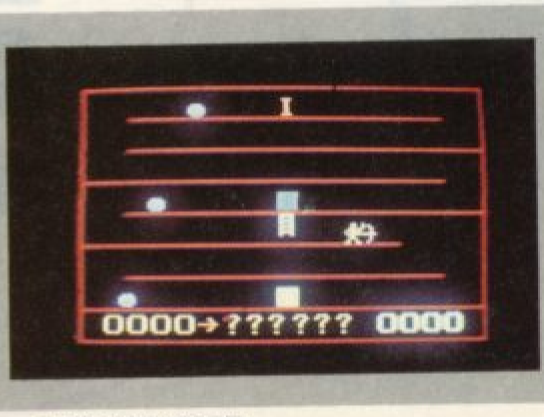
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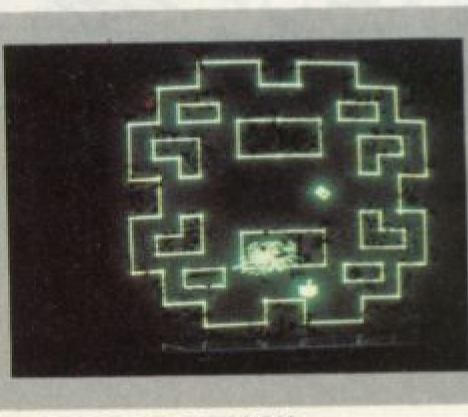
PHASER PATROL



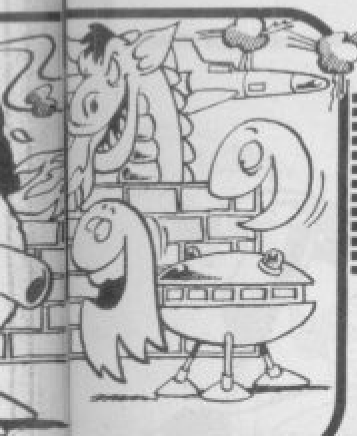
DRAGON STOMPER



PICKAXE PETE



ARMOUR ATTACK



GAMING

I won't spoil the game by telling you what you'll find once you step into the darkness through the — suffice it to say that you'll need all your wits about you to survive and defeat the Dragon.

The joystick controls are easy to master — you just look at the read out at the bottom of the screen which gives a running commentary on what's going on.

And the multi-load feature is equally easy to cope with — again all the instructions are flashed up on screen. The game comes in an attractive box with a detailed booklet which gives a background to the game.

THE VERDICT

An interesting departure from the normal space games. But will you want to play it again once you've solved all the puzzles?

- **Action** ⊥⊥⊥⊥
- **Graphics** ⊥⊥⊥
- **Addiction** ⊥⊥⊥
- **Theme** ⊥⊥⊥⊥

TAKE YOUR PICK-AXE!

Pickaxe Pete is the Philips G700's answer to Donkey Kong. It follows the familiar leaping over rolling deadly objects and avoiding dropping fireballs while heading toward the top of the screen along a series of platforms.

Mine games for computers are currently enjoying a boom thanks to Manic Miner from Bug Byte and Miner 2049'Er for the Atari. This video game is an adequate substitute for video games centre owners — but it doesn't have the same addictive quality.

The graphics are uninspiring and the game rapidly becomes unchallenging. You can't really call it boring as it takes some time to get to grips with — and after that there's always the chance that something new might be behind the spinning doors that keep changing colour.

Which brings us on to a brief description of the game. Once you've plugged in the cartridge you'll see a screen full of platforms, rolling boulders and those three colourful spinning doors — at different levels along the platforms.

Your aim is to reach the top where you'll be rewarded with a golden key which opens the revolving doors. Then you go on to the next screen.

You are armed with a pickaxe which smashes the rolling boulders. But after a while this disappears — and you have to duck and jump the deadly rocks. A spare pick will appear from time to time at the bottom of the screen — but you'll have to go all the way back down to take it.

Once you've got the key you can enter any one of the three doors — the grey one leads into an invisible maze.

You score points — and add to your golden hoard — by evading boulders, smashing boulders, getting a new pickaxe, getting a key and getting through the door.

There are supposed to be nine levels of play — but to me most of the arrangements of the platform looked remarkably similar.

THE VERDICT

Not the best game for the Philips system. You'll probably find better in their catalogue.

- **Action** ⊥⊥
- **Graphics** ⊥⊥
- **Addiction** ⊥⊥
- **Theme** ⊥⊥

SCREENS OF ALIENS

Take off to the stars and fight hordes of invading alien craft in Arcadia's Supercharger revamp of Atari's now famous Star Raiders shoot 'em up.

Phaser Patrol was the first in the Arcadia Starpath Supercharger range of tape games for the VCS — and a great way to kick off too! This is the tape you'll get if you fork out for a Supercharger as it comes with the add-on package.

Once you've loaded up the tape — and it couldn't be easier — you're off into deep space where the awesome Dracon armada of battle cruisers awaits.

Your object is simple — just blast them out of the skies! You are provided with a star-map of the area which your patrol covers. It shows the enemy ships, friendly star-bases and unknown sectors.

Your screen display gives you a read out of the condition of all your instruments.

A really nice feature of the game is the defence screen. You can turn this on and off at will during the game — unless it's destroyed by a Dracon blast.

When you turn the shield on two grey translucent panels gradually slide into place over your view of space. When it gets damaged a gap appears.

THE VERDICT

A classic space shoot out.

- **Action** ⊥⊥⊥⊥
- **Graphics** ⊥⊥⊥⊥
- **Addiction** ⊥⊥⊥⊥
- **Theme** ⊥⊥⊥

TRAPPED BY THE TANKS

Suddenly this heavily armed helicopter loomed over the horizon, hovered for a moment and then fired a lethal heat seeking missile at my armoured gun carrier. The tanks were closing in, too. My only chance was a dodge behind a ruined building and hope for a breathing space from their deadly attack...

Armour Attack is the Vectrex owner's answer to those tank battle games featured on early arcade machines — and a good adaptation it is, too! Not only do you have to fight off those marauding armoured monsters, there's also that flying gun platform of a helicopter to deal with.

And you can't always assume that a tank is dead once you've blasted it. You have to hit those things twice before they give up the fight. Hit a tank only once and they can still fire back despite being crippled.

The graphic representation of the tanks and your armoured car is fairly average, but the helicopter is a small masterpiece — with whirling blades and a realistic hovering action.

When you blast a chopper it spins off the screen with bits missing in a satisfactory fashion. And the graphics for the destroyed tanks are quite neat, too.

There are three skill levels and a two player option, too. All in all a nice package for the Vectrex.

THE VERDICT

A great game for battle fans which makes good use of the Vectrex graphics. Worth taking a look at.

- **Action** ⊥⊥⊥⊥
- **Graphics** ⊥⊥⊥
- **Addiction** ⊥⊥⊥⊥
- **Theme** ⊥⊥

FLIGHT INTO OBLIVION

Bombs away! Here's your chance to take the hot seat and pilot a World War II fighter bomber.

Mission X — a quite successful arcade machine — has been converted for the Intellivision video games console. The cartridge is a fair reproduction of the original game, faithfully reproducing most of Mission X's graphics.

The game consists of bombing fifteen or so moving and stationary targets including bridges, railways, cargo ships and enemy aircraft positioned on a constantly moving background of open sea, river valleys, a mountain scene and an airport runway.

Sound and graphics are up to the Intellivision's usual high standard but the movement of the bomber is often erratic and difficult to control. It can be very frustrating when the plane doesn't go in the direction you want.

I have always thought that the fire buttons on the Intellivision were a little stiff, and after only a short time playing Mission X I can assure you that your fingers get very sore.

I can't help thinking that Mission X belongs to that fast growing breed of video games that are visually very impressive but lack an interesting or original idea as a base for the game.

Whereas a game in the same vein as Mission X, called River Raid for the Atari VCS is a much more addictive and playable game and one that doesn't rely on timing as a basis for a video game.

River Raid for the Atari is streets ahead of the Mattel's Mission X on the playability stakes and with the cartridge selling for around £24.95 you can't help feeling it's a little overpriced.

THE VERDICT

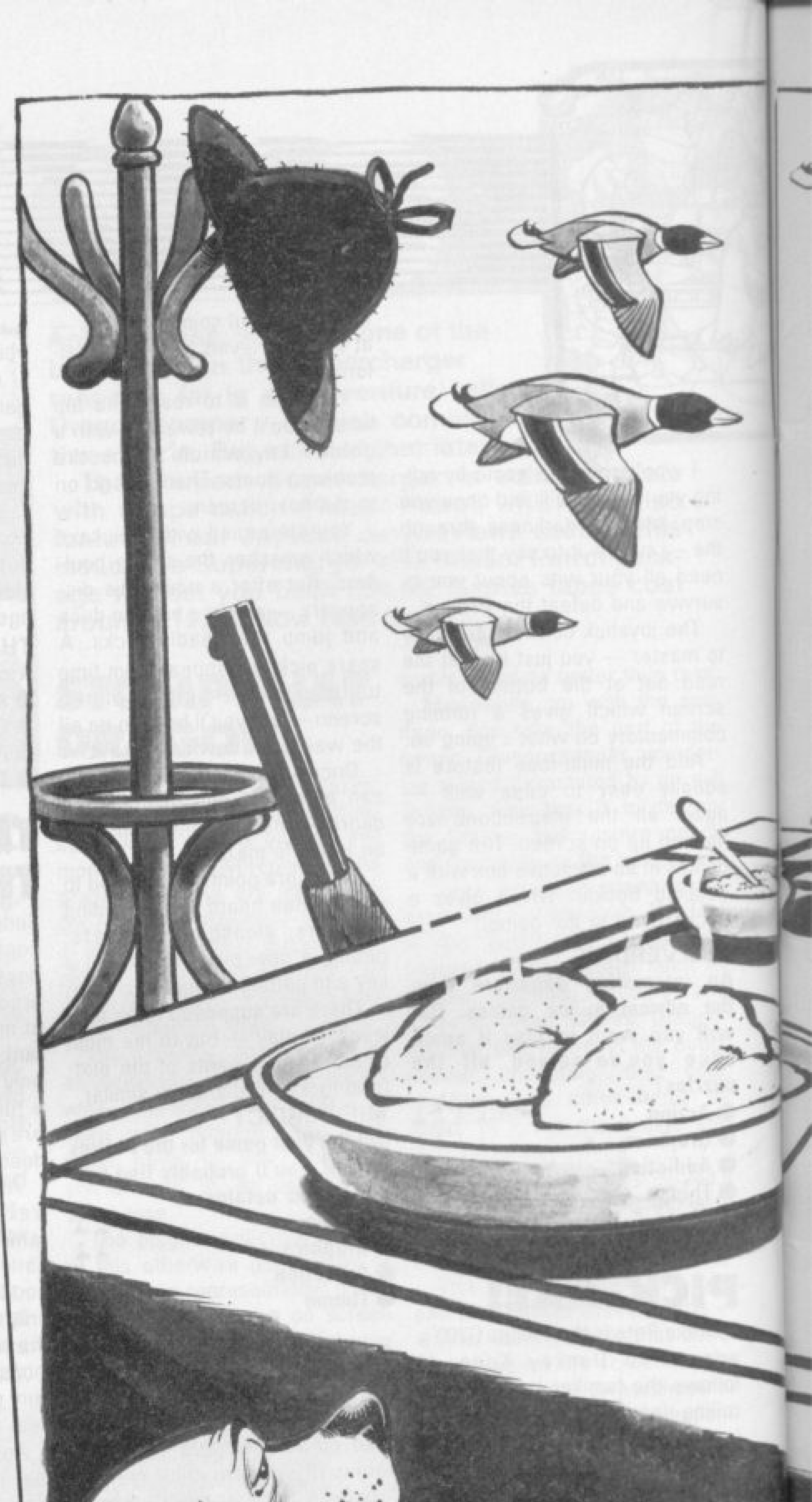
I wanted to stop playing as soon as I started.

- **Action** ⊥
- **Graphics** ⊥⊥⊥
- **Addiction** ⊥
- **Theme** ⊥

BY TIM JACKSON

```
10 REM DUCKSHOOT
20 REM BY TIM JACKSON, DEC 81
30 REM USES PROGRAMMER'S TOOLBOX FOR SOUND EFFECTS
40 REM AVAILABLE FROM PROGRAM POWER, 5 WENSLEY ROAD, LEEDS 7
50 REM OTHERWISE, DELETE LINES 740,940 & 980 TO 1080
60 DIM X3,Y3,R3,B25,LL10,V8,W8
70 PRINT $12"                    DUCKSHOOT"'
80 PRINT"                        ---------"''''
90 PRINT"PRESS SHIFT TO AIM LEFT"'
100 PRINT"PRESS REPT  TO AIM RIGHT"'
110 PRINT"PRESS SPACEBAR TO FIRE"'
120 PRINT $21
130 GOSUB 1090;GOSUB 1090
140 PRINT $6
150 REM SET DUCK SHAPES
160 !B=#3E7FC000;B!4=#81C
170 B!6=#3E7FDC08;B!10=0
180 B!12=#7CFE0300;B!16=#1038
190 B!18=#7CFE3B10;B!22=0
200 REM SET VECTORS TO DUCK SHAPES
210 !#90=B;!#92=B+6
220 !#94=B+12;!#96=B+18
230 REM SET GUN & BULLET DIRECTION VECTORS
240 !V=#3020100;V!4=#7060504;V?8=8
250 !W=#6060504;W!4=#5060606;W?8=4
260 REM G IS CURRENT GUN DIRECTION (0-8)
270 REM ACCESSED BY V?G FOR HORIZ;W?G FOR VERTICAL
280 REM S&T ARE CURRENT X&Y OF BULLET
290 REM K&L GIVE INCREMENTS TO S&T(FROM I&J OF GUN WHEN FIRED)
300hPRINT'''''"PRESS SPACEBAR WHEN YOU'RE READY"
310 LINK #FFE3
320 T=0;REM BULLET OFF
330 FOR N=0 TO 3;Y?N=200;NEXT
340 CLEAR 2
350 Q=#8000
360 FOR N=0 TO #5FF STEP 2
370 Q?N=-1; Q?(#5FF-N)=-1
380 NEXT N
390 REM INITIAL GUN:
400 G=4;GOSUB9
410 ?#B000=?#B000!9;REM SET KEYBD TO DETECT SPACEBAR
420 H=0;REM ZERO SCORE
430 FOR A=1 TO 10
440 FOR E=0 TO 3
450 IF Y?E<200 Z=0;GOTOf
460 REM CREATE DUCK
470 REM HEIGHT(48 TO 90)
480 Y?E=RND&7*6+48
490 REM R?E IS +1 IF MOVING RIGHT,-1 FOR LEFT
500 R?E=RND&2-1
510 REM X?E IS 0 OR 15 TO START
520 X?E=(1-R?E)&#FF/2*15
530 REM INSERT IT
540 D=E;LINK LL0
550 Z=-(RND&7+2)
560 REM MOVE EVERYTHING
570fFOR F=Z TO 0
580 FOR D=0 TO 3
590 LINK LL6;REM MOVE DUCK D
600 Q=1
610 REM GUN TO LEFT IF SHIFT PRESSED
620 IF ?#B001<128;IF G>0;GOSUB9;G=G-1;GOSUB9;Q=0
630 REM GUN TO RIGHT IF REPT PRESSED
640 IF ?#B002&#40=0;IF G<8;GOSUB9;G=G+1;GOSUB9;Q=0
650 REM CHECK FIRE BUTTON(SPACEBAR) & CREATE BULLET
660 IF T=0;IF ?#B001&1=0;S=I+67;T=J;K=I/2;L=J/2;PLOT 14,S,T
670 REM MOVE BULLET
680 IF T GOSUBp;Q=0
690 IF Q;FOR N=0 TO 100;NEXT
700dNEXT D
710 NEXT F
720 NEXT E
730 NEXT A
740 GOSUB 990;REM PLAY TUNE
750 PRINT $12"                 DUCKSHOOT"'
760 PRINT"                     ---------"''''''
770 PRINT"YOUR SCORE WAS",H
780 GOTO h
790 REM INSERT/DELETE GUN
800gI=V?G*2-8;J=W?G*2
810 MOVE 66,0;WAIT;PLOT2,I,J
820 MOVE 68,0;WAIT;PLOT2,I,J
830 RETURN
840 REM MOVE BULLET
850pWAIT;PLOT14,S,T
860 S=S+K;T=T+L
870 IF S&#FF>127 OR T&#FF>95;T=0;RETURN
880 FOR C=0 TO 3
890 IF Y?C=T/6*6;IF X?C=S/8;GOSUB4;C=3;NEXT;RETURN
900 NEXT
```

Illustration: Terry Rogers



This is definitely not a game for conservationists, birdwatchers or anyone who likes our feathered friends — particularly ducks. If you count yourself in any of those groups don't read on. Turn the page and save your feelings. Right, those of you that are left must be a bloodthirsty bunch. Definitely not candidates for the League Against Cruel Sports. The aim of the game is to shoot poor defenceless little ducks out of the sky.



RUNS ON AN ATOM IN 4.5K

```
 910 WAIT;PLOT14,S,T
 920 RETURN
 930:REM A HIT!
 940 FOR N=0 TO 7;BEEP 80,1;BEEP 50,1;NEXT
 950 U=X;X=C;LINK LL10;X=U;REM DELETE DUCK
 960 Y?C=200;T=0;F=0;H=H+1
 970 RETURN
 980 REM COLONEL BOGEY
 990 RESTORE
1000 FOR N=1 TO 11
1010 READP,Q
1020 BEEP P,Q
1030 NEXT N
1040 RETURN
1050 DATA #A1,10,#C0,10,0,10
1060 DATA #C0,10,#B5,10,#A1,10
1070 DATA #60,15,0,5,#60,15
1080 DATA 0,5,#79,20
1090 DIM P(-1)
1100[
1110:LL5 BIT #B002;BMI LL5 WAIT FOR TV FLY BACK
1120 RTS
1130\GET SCREEN ADDRESS IN #98
1140:LL0 LDX #325 GET D
1150:LL10 LDA @#20;STA #99
1160 LDA @95
1170 SEC
1180 SBC Y,X  GET 95-Y?D
1190 BCC LL5  OFF SCREEN
1200 ASLA;ASLA TIMES 16
1210 ASLA;ROL #99
1220 ASLA;ROL #99
1230 ORA X,X  GET X?D
1240 STA #98
1250\INSERT/DELETE DUCK
1260 LSRA  CARRY FLAGS WINGS UP OR DOWN
1270 LDA R,X  GET R?D
1280 BPL LL2  GET 0 IF GOING LEFT,ELSE 1
1290 LDA @0
1300:LL2 ROLA;ASLA NOW HAVE OFFSET FROM #90 FOR SHAPE
1310 TAX
1320 LDA #90,X
1330 STA #9A
1340 LDA #91,X
1350 STA #9B
1360 LDX @0
1370 LDY @5
1380:LL1 BIT #B002;BMI LL1 WAIT FOR TV FLYBACK
1390:LL3 LDA(#9A),Y GET PATTERN
1400 EOR(#98,X) INVERT SCREEN
1410 STA(#98,X)
1420 LDA #98;SEC
1430 SBC @16 NEXT SCREEN ADDRESS
1440 STA #98
1450 BCS LL4
1460 DEC #99
1470:LL4 DEY
1480 BPL LL3
1490 RTS
1500\MOVE DUCK D
1510:LL6 JSR LL0 DELETE IT
1520 LDX #325 GET D
1530 LDA X,X GET X?D
1540 CLC
1550 ADC R,X INC.OR DEC.IT
1560 STA X,X
1570 CMP @16;BCC LL7
1580 LDA @200;STA Y,X  Y?D=200 IF OFF SCREEN
1590 RTS
1600\CHECK FOR DUCK COLLISIONS
1610:LL7 LDY @3
1620:LL8 CPY #325 EQUALS D?
1630 BEQ LL9
1640 LDA Y,Y;CMP Y,X
1650 BNE LL9
1660 LDA X,Y;CMP X,X
1670 BNE LL9
1680\COLLISION,SO DELETE OTHER DUCK
1690 TYA;PHA SAVE Y
1700 TAX - AND USE IN PLACE OF D
1710 JSR LL10 DELETE DUCK
1720 LDX #325 GET D
1730 PLA;TAY GET Y
1740 LDA @200 PUT BOTH DUCKS OFF SCREEN
1750 STA Y,Y;STA Y,X
1760 LDA @0;STA #327;STA#342;STA#35D;STA#378  ZERO F
1770 RTS
1780:LL9 DEY CONTINUE LOOP
1790 BPL LL8
1800 JMP LL0 INSERT DUCK AND RETURN
1810];RETURN
```

SHOOT

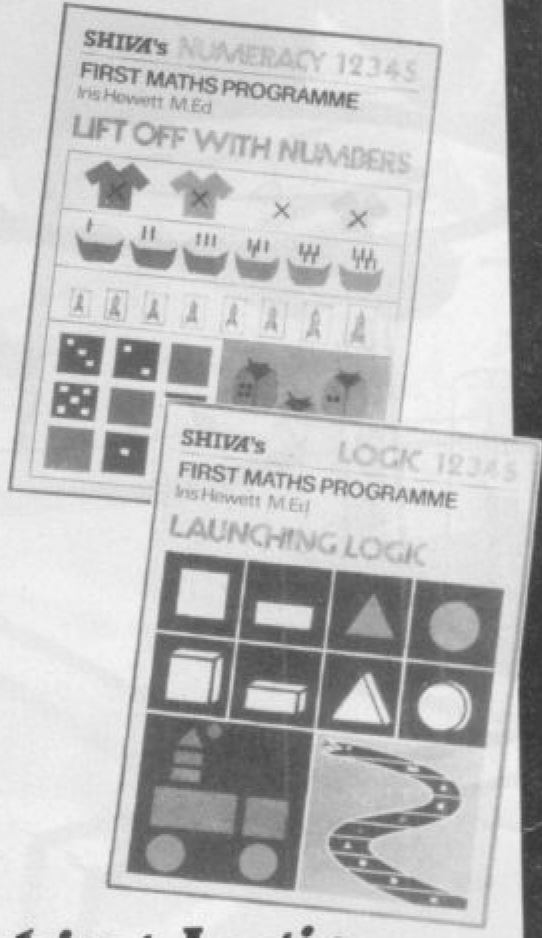
The ducks fly across the screen at random heights and spacing. You manipulate a gun-barrel at the bottom of the screen. The "Shift" and "Repeat" keys move the gun left and right while the space bar fires the deadly bullet.

The program as listed utilises graphics mode 2; by deleting all the comments the program will fit into 3k plus the mode 2 graphics requirement. The symbol ":" on line 410 should be typed in as a shifted backslash (the Atom's OR operator).

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ARCADE ARENA



Welcome to arcade arena — your chance to prove yourself a keyboard wizard. This month we've got games for the Dragon, ZX81, Texas and the BBC A. Each is a special arcade style game which will test your co-ordination to the limit. But if you are under 16 and think you can take on all-comers at the game of your choice — and end up with a top score — then we want to hear from you. Achieve the highest score you can on the game we've published for your machine and get one of your parents or a teacher to witness your score and then fill in the form on this page. With your score duly recorded and signed by your willing witness all that's left to do is to pop it in the post to us at Computer and Video Games to reach us before October 16th. The top three players of each game will be invited to a grand final at a venue and date yet to be fixed.

Please enter the following score in your Arcade Arena Competition. I scored ....

on the following game:

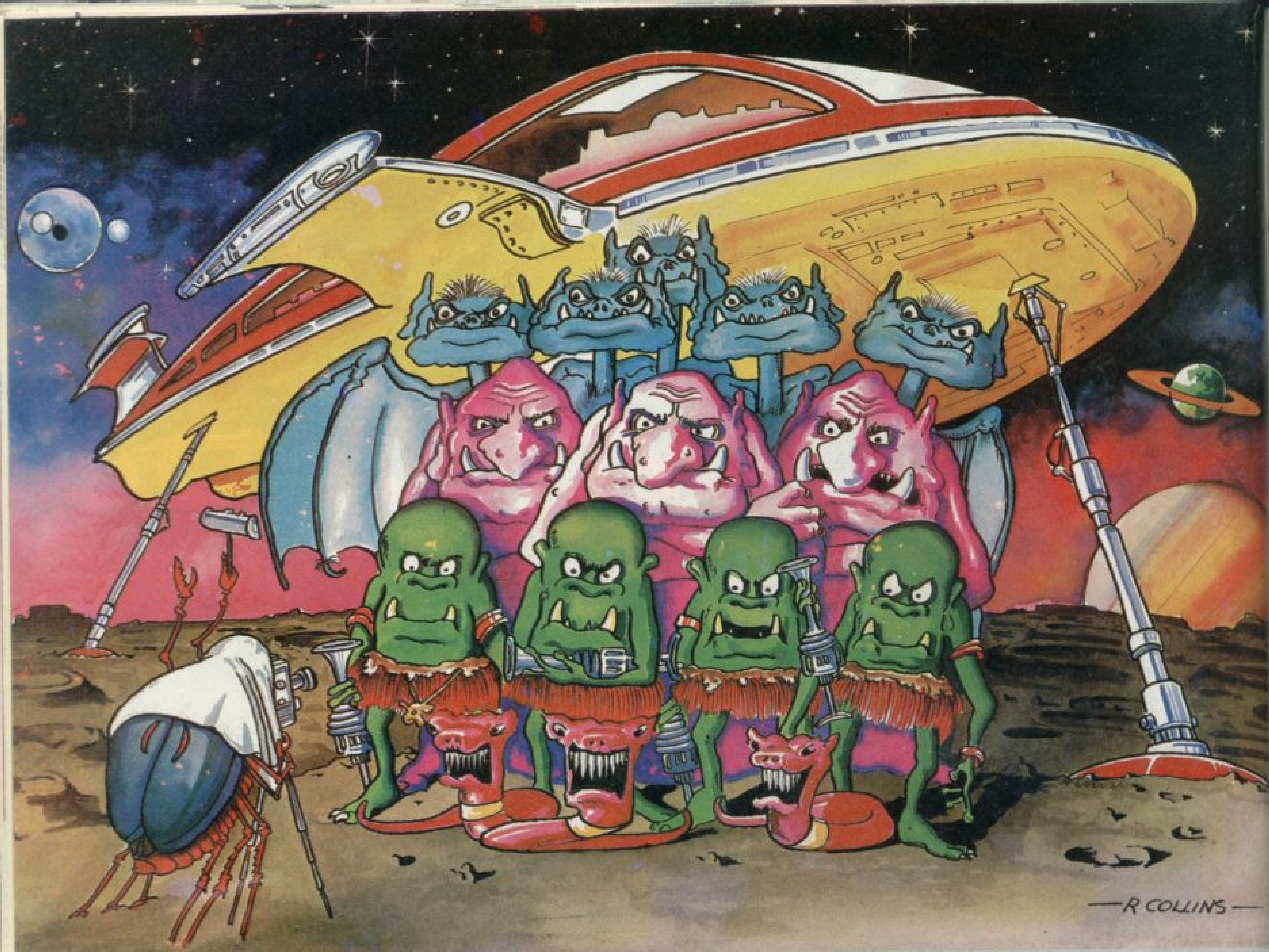
BBC INVADER ☐ **CHICKEN** ☐ **SLALOM** ☐ **LIGHT CYCLES** ☐

SCORE WITNESSED BY: .... **WITNESS' SIGNATURE:** ....

MY NAME IS: .... **ADDRESS:** ....

.... **TEL:** ....

GULBIS



No arcade supplement would be complete without them, those little green aliens who invaded the hearts of millions and began the video boom all those years ago.

We've looked through our files and uncovered a version of the game that launched a thousand aliens. This version of the classic video game has it all. Four rows of different coloured aliens. A mother ship which when hit registers a mystery score. Multiple bombs, six screens of varying difficulty. All this and the sound effects too! Keys to control your laser bases are Z for left, X for right. The space bar fires your laser. Type the program in using Mode 6.

All instructions are in BBC/Microsoft Basic apart from:—

1. Function FNHIT which uses the Acorn PEEK (?) to examine the screen location in front of the Bombs and Bullets.
2. *FX calls *11, 1 to speed up the keyboard.
   15, 1 to prevent excessive keyboard repeats.
3. *TV 255 to lower the TV display.
4. VDU to disable the cursor (lines 10, 20, 30, 180)

A suggested Amendment to provide skill levels is:
Line No.
305 INPUT TAB (10, 22) "SKILL LEVEL 1 or 2" SKILL.
1735 IF SKILL = 1 AND C = −1 GO TO 1750.

This should have the effect of moving the aliens down every reversal on SKILL 2 (this is the existing SKILL level), and every other line on SKILL 1.

Also, for the real enthusiast, Assembler routines to move the Mother Ship and Bullets and Bombs would give a much smoother flow to the game, overcoming even the BBC Basic's slowness. If you write the routines, send me a copy, please!

A = Start of print of Invaders in the For:Next loop
B = Finish of print in the For: Next loop
C = Step Value (+ or −2) in the For: Next loop
AL to DL = Count of "Shot" Invaders. Used to prevent line print if all Invaders shot
B1 (1 to 2) = Character position of random Bomber
B2 (1 to 2) = Line position of Bomb
B3 = prevents print of space (if value 2) on initial bomb drop
B4 (1 to 10) = Invader Column. When value = 4 complete column destroyed.
F1 = Character position of Bullet
F2 = Line position of Bullet
F3 = Character position (F1) converted to position of Invader in String (AS to DS)
H = Height of Invader line (in TAB)
N = Character Position of Base (in TAB)
NT & ST are Time Variables. ST used at Program Start and Mothership. NT in Main Loop. NT is adjusted after shooting a full screen.
AS to DS (1 to 20) = Line of Invaders in sets 1 to 10, 11 to 20 for movement.
AAS (1 to 3) = Display of lines left (as Bases)
A% = Step in main loop to spacefill the AS — DS after shooting an Invader.
C% = Record of full screens "shot". Adjusts score, start line and Time loop.
H% = Used in Mothership processing.
I% = Sets up AS to DS.
J% = General For:Next Loops.
L% = Used in Scoring.
M% = Used in moving Laser Base.
X% = Used as result from FNHIT.
Y% = Score — High Score.
Z% = INKEY

BY ROBIN WHITEHEAD

BBC INVADER

RUNS ON A BBC'A' IN 5.8K

```
>LIST
    5ON ERROR GOTO 2500
   10 *TV 255
   20 VDU 23;8202;0;0;0;
   40 SCORE=0:H%=0:F1=0:F2=0
   50 DIM A$(20):DIM B$(20):DIM
C$(20):DIM D$(20):DIM B1(3):DIM
B2(3):DIM B4(10):DIM AA$(3)
   60 IF X%=89 GOTO 320 ELSE Y%=
0:GOTO 200
   70DEF PROCBASE
   90M%=0
  100 IF INKEY(-98) M%= -1:GOTO1
40
  110 IF INKEY(-67) M%= 1:GOTO14
0
  120 IF INKEY(-99) PROCFIRE
  130 GOTO190
  140N=N+M%
  150IF N=36 N=N-1
  160IF N<1 N=N+1
  170PRINTTAB(0,23)CHR$(&96);TAB
(N,23)" ~} "
  180*FX 15,1
  190ENDPROC
  200 MODE 7
  210 REM SPACE INVADERS - R. WH
ITEHEAD -            JUNE 1982
  220 PRINTTAB(10,2)CHR$(141);CH
R$(&83)"BEEB INVADERS"
  230 PRINTTAB(10,3)CHR$(141);CH
R$(&83)"BEEB INVADERS"
  240 PRINTTAB(9,6)CHR$(&95)"f{w
9";CHR$(&81)"  =  MYSTERY POINTS
"
  250 PRINTTAB(10,8)CHR$(&94)"91
";CHR$(&84)"  =   100 POINTS"
  260 PRINTTAB(10,10)CHR$(&93)"f
9";CHR$(&83)"  =    80 POINTS"
  270 PRINTTAB(10,12)CHR$(&92)"n
y";CHR$(&82)"  =    60 POINTS"
  280 PRINTTAB(10,14)CHR$(&91)"~
}";CHR$(&81)"  =    40 POINTS"
  290 PRINTTAB(10,16)"Z KEY = LE
FT";TAB(10,18)"X KEY = RIGHT"
  300 PRINTTAB(10,20)"SPACE BAR
TO FIRE LASER"
  310 ST=TIME:REPEAT UNTIL TIME=
ST+500
  320 CLS:PRINTTAB(10,0)SCORE:AA
$(1)="~}":AA$(2)="~}":AA$(3)="~}
"
```

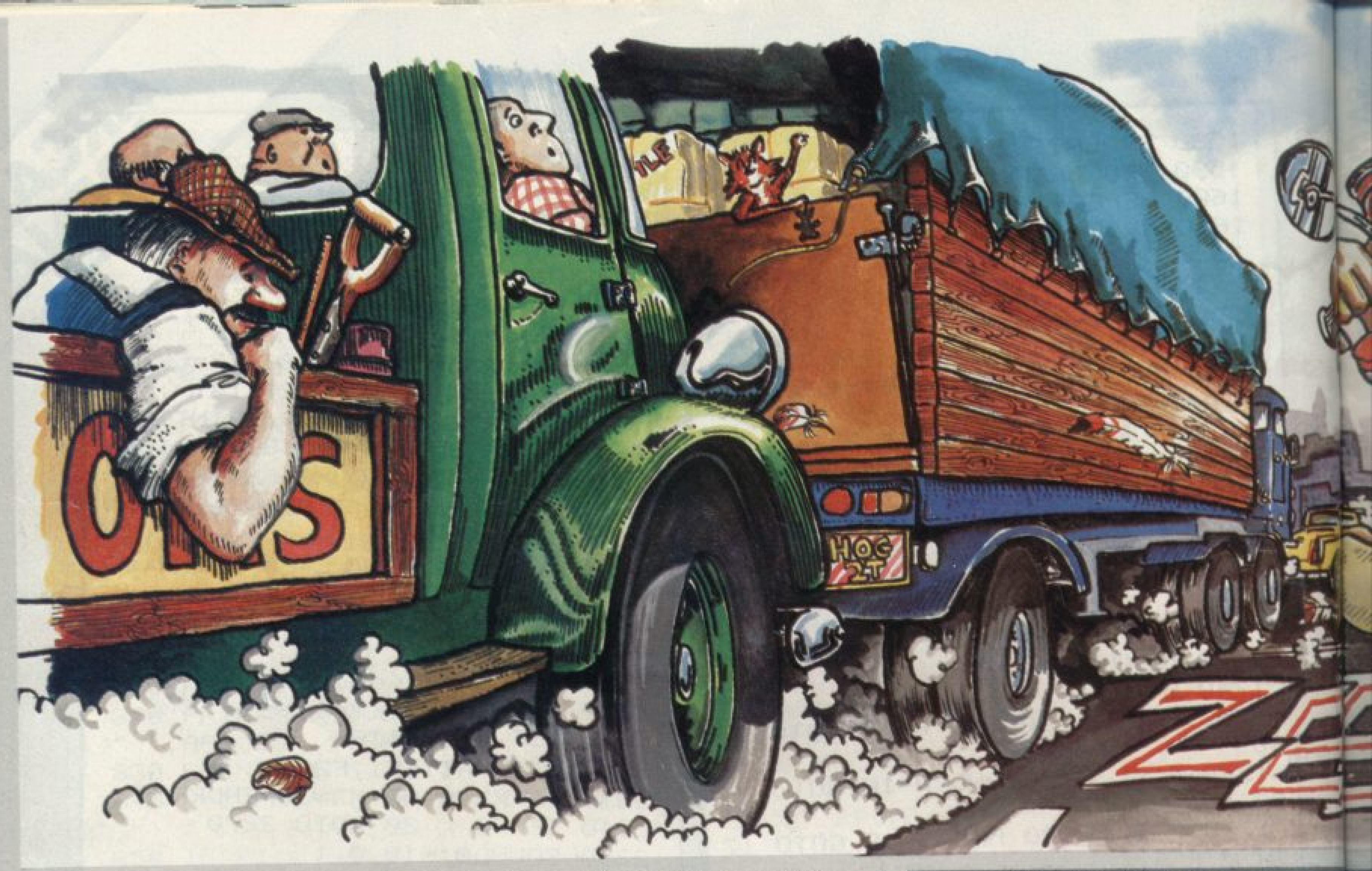
```
  330 PRINTTAB(0,0)CHR$(&96);AA$
(1);" "AA$(2);" "AA$(3);CHR$(&87
);TAB(22,0)"HIGH SCORE = ";Y%
  340 ST=TIME:GOTO 1000
  350DEF PROCBOMB
  360 IF B1(1)+B1(2) <> 0 PROCDR
OP:ENDPROC
  370 FOR J%=1 TO RND(2)
  380 B1(J%) = RND(10)
  390 IF B4(B1(J%))=4 GOTO 500
  400 IF DL < 10 GOTO 440
  410 IF CL < 10 GOTO 450
  420 IF BL < 10 GOTO 460
  430 GOTO 470
  440 IF D$(B1(J%)) <> "  " B2(J
%)=H+7:GOTO 480
  450 IF C$(B1(J%)) <> "  " B2(J
%)=H+5:GOTO 480
  460 IF B$(B1(J%)) <> "  " B2(J
%)=H+3:GOTO 480
  470B2(J%)=H+1
  480B1(J%)=(B1(J%)*2)+I
  490 B3=0
  500NEXT
  510PROCDROP
  520 ENDPROC
  530DEF PROCDROP
  540 FOR J%=1 TO 2
  550 IF B1(J%)=0 GOTO 660
  560 IF B3=0 B3=B3+1:GOTO 590
  570 IF B3=1 AND B1(2) > 0 B3=B
3+1:GOTO 590
  580 PRINTTAB(B1(J%),B2(J%)-1)"
 "
  590 X%=FNHIT(B1(J%),B2(J%))
  600 IF B2(J%) < 23 GOTO 620
  610 IF X% <> 0 AND X% <> 32 PR
OCGOTYOU:PROCBASE:GOTO 650 ELSE
GOTO 650
  620  IF X%=0 OR X%=32 PRINTTAB
(B1(J%),B2(J%))"!":B2(J%)=B2(J%)
+1:GOTO 660
  630 IF X%=94 PRINTTAB(B1(J%),B
2(J%))"  ":F1=0:GOTO 650
  640 IF X%=255 PRINTTAB(B1(J%),
B2(J%))"a" ELSE PRINTTAB(B1(J%),
B2(J%))" "
  650B1(J%)=0
  660NEXT
  670 ENDPROC
  680 DEF PROCGOTYOU
```

```
  690 SOUND0,-10,14,15
  700 PRINTTAB(B1(J%)-1,23)CHR$(
&91)"~}"
  710 NT=TIME:REPEAT UNTIL TIME=
NT+100
  720 LIVE=LIVE+1
  730 IF LIVE < 3 GOTO 810
  740 CLS:PRINTTAB(10,10)"GAME O
VER"TAB(10,12)"YOUR SCORE =  ";S
CORE
  750IF SCORE<Y% PRINTTAB(10,14)
"HIGH SCORE =  ";Y% ELSE PRINTTA
B(10,14)"THIS IS THE HIGH SCORE"
:Y%=SCORE
  760 PRINTTAB(10,18)"ANOTHER GA
ME?":X%=0:X%=GET:IF X%=89 RUN
  770 IF X% <> 78 THEN 740
  780 CLS
  800 END
  810 AA$(LIVE)="  "
  820 PRINTTAB(0,0)CHR$(&96)AA$(
1)" ";AA$(2)" ";AA$(3)
  830 PRINTTAB(N,23)"    "
  840 N=1:PRINTTAB(0,23)CHR$(&96
)" ~} "
  850 IF F1>0 PRINTTAB(F1,F2)" "
  860 F1=0
  870 ENDPROC
  880 DEF PROCL1
  890 PRINTTAB(0,H)CHR$(&94);TAB
(I,H)"  ";A$(A%+1);" ";A$(A%+2);
" ";A$(A%+3);" ";A$(A%+4);" ";A$
(A%+5);" ";A$(A%+6);" ";A$(A%+7)
;" ";A$(A%+8);" ";A$(A%+9);" ";A
$(A%+10);" "
  900ENDPROC
  910 DEF PROCL2
  920 PRINTTAB(0,H+2)CHR$(&93);T
AB(I,H+2)"  ";B$(A%+1);" ";B$(A%
+2);" ";B$(A%+3);" ";B$(A%+4);"
";B$(A%+5);" ";B$(A%+6);" ";B$(A
%+7);" ";B$(A%+8);" ";B$(A%+9);"
 ";B$(A%+10);" "
  930ENDPROC
  940DEF PROCL3
  950 PRINTTAB(0,H+4)CHR$(&92);T
AB(I,H+4)"  ";C$(A%+1);" ";C$(A%
+2);" ";C$(A%+3);" ";C$(A%+4);"
";C$(A%+5);" ";C$(A%+6);" ";C$(A
%+7);" ";C$(A%+8);" ";C$(A%+9);"
 ";C$(A%+10);" "
  960ENDPROC
  970DEF PROCL4
  980 PRINTTAB(0,H+6)CHR$(&91);T
AB(I,H+6)"  ";D$(A%+1);" ";D$(A%
+2);" ";D$(A%+3);" ";D$(A%+4);"
";D$(A%+5);" ";D$(A%+6);" ";D$(A
%+7);" ";D$(A%+8);" ";D$(A%+9);"
 ";D$(A%+10);" "
  990ENDPROC
 1000 N=0:AL=0:BL=0:CL=0:DL=0
 1010FOR I%=1 TO 10
 1020A$(I%)="n$"
```

```
1030NEXT
1040FOR I%=11 TO 20
1050A$(I%)="91"
1060NEXT
1070FOR I%=1 TO 10
1080B$(I%)="f9"
1090NEXT
1100FOR I%=11 TO 20
1110B$(I%)=".'"
1120NEXT
1130FOR I%=1 TO 10
1140C$(I%)="ny"
1150NEXT
1160FOR I%=11 TO 20
1170C$(I%)="v="
1180NEXT
1190FOR I%=1 TO 10
1200D$(I%)="~}"
1210NEXT
1220FOR I%=11 TO 20
1230D$(I%)=">m"
1240NEXT
1250 A=0:B=0:C=0:A%=0:H=2+C%:F1
=0
1260  PRINTTAB(0,20)CHR$(&92);
1270 FOR I%=1 TO 4
1280  PRINT" x"CHR$(&FF)CHR$(&F
F)CHR$(&FF)"t      ";
1290 NEXTI%
1300 PRINTTAB(0,21)CHR$(&92);
1310 FOR I%=1 TO 4
1320 PRINT" "CHR$(&FF)CHR$(&FF)
" "CHR$(&FF)CHR$(&FF)"      ";
1330 NEXT I%
1340 PRINTTAB(0,23)CHR$(&96)" ~
} "
1350 PROCA
1360FOR I=A TO B STEP C
1370 IF TIME-ST >= 500 PROCMSHI
P
1380 IF A%=20 A%=0
1390 IF H%>2 AND H%<33 PROCMSHI
P
1400 IF AL=20 GOTO 1430
1410 PROCL1
1420 PROCBASE
1430 IF BL=20 GOTO 1470
1440 PROCL2
1450 PROCBASE
1460 IF H%>2 AND H%<33 PROCMSHI
P
1470 IF CL=20 GOTO 1500
1480 PROCL3
1490 PROCBASE
1500 IF DL=20 GOTO 1530
1510 PROCL4
1520 PROCBASE
1530 PROCBASE
1540 PROCHIT
1550 NT=TIME+(40-(C*10))
1560 A%=A%+10
1570 SOUND 3,-10,A%+1,4
```

```
 1580 PROCHIT
 1590 PROCBASE
 1600 REPEAT PROCBASE
 1610 PROCHIT
 1620 UNTIL TIME>=NT
 1630NEXTI
 1640 GOTO 1350
 1650 DEF PROCA
 1660 IF B=8 A=8:B=1:C=-1 ELSE B
=8:A=1:C=1
 1670 FOR J%=0 TO 6 STEP 2
 1680 IF J%=0 AND AL=20 GOTO 173
0
 1690 IF J%=2 AND BL=20 GOTO 173
01700 IF J%=4 AND CL=20 GOTO 173
01710 IF J%=6 AND DL=20 GOTO 173
0
 1720 PRINTTAB(1,H+J%)"
 1730 NEXT                        "
 1740 H=H+1
 1750IF DL < 20 AND H=14 GOTO 17
90
 1760IF CL < 20 AND H=16 GOTO 17
90
 1770IF BL < 20 AND H=18 GOTO 17
90
 1780IF H < 20 GOTO 1800
 1790 J%= 1:B1(J%)=N: LIVE=3:PRO
CGOTOYOU
 1800 ENDPROC
 1810DEF PROCFIRE
 1820 IF F1 > 0 GOTO 1850
 1830 F1=N+1
 1840 F2=22
 1850 PROCHIT
 1860 IF F1 = 0 GOTO 1880
 1870 PRINTTAB(F1,F2)"^"
 1880ENDPROC
 1890 DEF PROCHIT
 1900 PROCBOMB
 1910 IF F1=0 GOTO 1970
 1920 PRINTTAB(F1,F2)" "
 1930 F2=F2-1
 1940 PROCHITA
 1950 IF F2 < 1 F1=0:GOTO 1970
 1960 IF F1 > 0 PRINTTAB(F1,F2)"
^"
 1970 ENDPROC
 1980DEF PROCSCORE
 1990 SCORE = SCORE+((10-(F2-H))
*10)
 2000 PRINTTAB(10,0)SCORE
 2010 F3=(F1-I)+1
 2020 F3=INT(F3/3)
 2030 B4(F3)=B4(F3)+1
 2040 L%=F2-H
 2050 FOR J%=1 TO 2
 2060 IF L%=6 GOTO 2120
 2070 IF L%=4 GOTO 2110
 2080 IF L%=2 GOTO 2100
 2090 A$(F3)="   ":AL=AL+1:GOTO 2
130
```

```
 2100 B$(F3)="   ":
BL=BL+1:GOTO 2130
 2110 C$(F3)="   ":
CL=CL+1:GOTO 2130
 2120 D$(F3)="   ":DL=DL+1
 2130 F3=F3+10
 2140 NEXT J%
 2150 IF AL+BL+CL+DL=80 C%=C%+1:
CLS:PRINTTAB(10,10)CHR$(141);CHR
$(&81)C%*100;" POINTS":PRINTTAB(
10,11)CHR$(141);CHR$(&81)C%*100;
" POINTS":SCORE=SCORE+C%*100:NT=
TIME:REPEAT UNTIL TIME=NT+350:X%
=SCORE
 2160 IF AL+BL+CL+DL=80 CLEAR:SC
ORE=X%:X%=89:GOTO 50
 2170 F1=0
 2180 ENDPROC
 2190 DEF FNHIT(ch,l)
 2200 =?(&7C00+(l*40)+ch)
 2210 DEF PROCHITA
 2220 X%=FNHIT(F1,F2)
 2230 IF X%=0 OR X%=32 ENDPROC
 2240 IF F2 < 20 GOTO 2270
 2250 SOUND0,-10,0,1
 2260 IF X% = 255 PRINTTAB(0,F2)
CHR$(&92)TAB(F1,F2)"2":F1=0:ENDP
ROC ELSE PRINTTAB(F1,F2)" ":F1=0
:ENDPROC
 2270 IF X%=124 PRINTTAB(F1,F2)"
 ":F1=0:ENDPROC
 2280 IF F2=1 PROCMHIT:GOTO 2330
 2290 IF F2=0 F1=0:GOTO 2330
 2300 PRINTTAB(F1,F2)"     "
 2310 SOUND0,-10,F2-H,5
 2320 PROCSCORE
 2330ENDPROC
 2340DEF PROCMSHIP
 2350IF H%>1 AND H%<33 GOTO 2380
 ELSE I%=RND(2)
 2360IF I%=1 I%=-2:H%=33 ELSE H%
=1
 2370 ST=0
 2380 PRINTTAB(0,1)CHR$(&95)TAB(
H%,1)"  f(w9  "
 2390 H%=H%+I%
 2400 IF H%=1 OR H%>= 33 ST=TIME
:PRINTTAB(0,1)"
                               "
 2410 ENDPROC
 2420DEF PROCMHIT
 2430 FORI%=0 TO 555  STEP 7:SOU
ND1,-15,I%,0:NEXT
 2440 SCORE=SCORE+(RND(3)*100)
 2450 PRINTTAB(9,0)CHR$(&86)SCOR
E;CHR$(&87)
 2460 PRINTTAB(H%,1)"          "
 2470 ENDPROC
 2500CLS
 2510IF ERR<>17 REPORT: PRINT"at
 line ";ERL
 2520*FX 15,1
```



Why did the chicken cross the road. Not to get to the Kentucky Fried shop that's for sure! To discover just why our feathered friend made this perilous journey you'll have to key in the game — and remember, if you get a top score let us know!

This is a version of that arcade favourite Frogger. Except this time the cute little green hopper has been replaced by flustered character of the feathered kind. Just like the frog this chicken has to cross a busy highway to get home. Will she make it? Over to you!

You get four lives to start with, and get an extra life for every 200 points scored.

There are two skill levels. The player must select which one he wishes to play at the start of each game. You use key 5 to move left, 8 to move right and 7 to go up.

PROGRAM NOTES

In order to speed the game up the author has used POKEs instead of the normal PRINT AT statements. Lines 60-70 hold the start locations of the POKE command.

BY PAUL GREENWOOD

CHIC

```
   0 REM BY PAUL GREENWOOD
   1 LET HC=INT (RND*100)+50
   2 LET N$="THE COMPUTER"
   3 GOTO 2000
   5 LET SC=0
   6 LET FR=4
   7 LET DC=200
  10 LET A$="▒▒▒DANGER▒▒▒HOME▒▒▒D
ANGER▒▒▒HOME▒"
  12 LET B$=" ▄▄▄  ▄▄▄    ▄▄▄   ▄
▄ ▄▄▄"
  15 PRINT AT 3,0;"▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀
▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀"
  20 PRINT AT 19,0;"▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀
▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀"
  25 FOR A=0 TO 31
  30 PRINT AT 11,A;"="
  40 NEXT A
  50 PRINT AT 0,0;"SCORE:?";AT 0
,20;"CHICKEN:4"
  55 PRINT AT 21,0;"HIGH SCORE:"
;HC;AT 21,17;"BY:";N$
  60 LET Z=1+PEEK 16396+256*PEEK
 16397
  70 LET N=Z+630+(INT (RND*20)+4
)
  80 LET D=0
 200 LET A$=A$(2 TO )+A$(1)
 210 LET B$=B$(2 TO )+B$(1)
 220 PRINT AT 1,0;A$
 225 PRINT AT 5,0;B$
 230 PRINT AT 7,5;B$
 235 PRINT AT 9,2;B$
 240 PRINT AT 13,0;B$
 245 PRINT AT 16,3;B$
 250 LET C=PEEK N
 260 POKE N,12
 270 IF INKEY$="7" THEN LET D=-3
3
 275 IF INKEY$="5" THEN LET D=-1
 280 IF INKEY$="8" THEN LET D=1
 285 IF OO=1 THEN LET V=D+-33
 290 IF OO=1 THEN LET N=N+V
 295 IF OO=0 THEN LET N=N+D
 300 IF OO=1 THEN POKE N-V,C
 301 IF OO=0 THEN POKE N-D,C
 310 IF C>=128 THEN GOTO 1000
 315 IF C>=42 AND C<=52 THEN GOT
O 1500
 320 GOTO 200
1000 LET FR=FR-1
1010 PRINT AT 0,20;"CHICKEN:";FR
1020 IF FR<=0 THEN GOTO 1800
1030 GOTO 60
1530 FOR F=SC TO SC+INT (RND*50)
+20 STEP 2
1540 PRINT AT 0,6;F
1550 NEXT F
1560 LET SC=F
1566 IF SC>=DC THEN LET FR=FR+1
1567 IF SC>=DC THEN LET DC=DC+20
0
1568 PRINT AT 0,20;"CHICKEN:";FR
1570 GOTO 60
1800 FOR P=1 TO 10
```



CKEN

RUNS ON A ZX81 IN 16K

Variables:
HC: high score (set at a number between 50-150).
NS: name to be entered using high score string.
SC: score.
FR: number of chickens (set at four).
DC: number score player has to beat to get extra chicken (set at 200).
A$: string containing chickens home and danger. The chequered characters must be entered as CHR$ 136.
B$: cars that chicken has to dodge (made up of CHR$ 129, CHR$ 138, CHR$ 129).
Z: start position on POKE command.
N: poke position for chicken.
D: direction of chicken.
C: check on position of chicken.
OO: skill level.

```
1802 NEXT P
1803 IF SC>HC THEN GOSUB 2100
1805 PRINT AT 0,20;"CHICKEN:0"
1806 PRINT AT 0,20;"CHICKEN:0"
1807 PRINT AT 21,0;"HIGH SCORE:"
;HC;AT 21,17;"BY:";N$
1808 PRINT AT 21,0;"HIGH SCORE:"
;HC;AT 21,17;"BY:";N$
1810 PRINT AT 15,0;"PRESS ANY KE
Y TO CONTINUE"
1820 IF INKEY$="" THEN GOTO 1805
1830 CLS
1840 GOTO 2180
2000 PRINT "          CHICKEN"
2010 PRINT AT 3,0;"TRY TO GET TO
 THE OTHER SIDE OF THE ROAD"
2020 PRINT AT 5,0;"TO THE CHICKE
NS HOME"
2030 PRINT AT 8,0;"IF HOWEVER ON
 THE WAY YOU HIT A """""" YOU
LOSE A LIFE"
2040 PRINT AT 10,0;"(YOU HAVE 4
LIVES)"
2050 PRINT AT 13,0;"IF YOU GET T
O THE OTHER SIDE    YOUR SCORE I
S INCREASED"
2060 PRINT AT 16,0;"YOU GET A NE
W CHICKEN EVERY 200 POINTS"
2070 PRINT AT 18,0;"THE KEYS ARE
 LEFT:5 UP:7 RIGHT:8"
2080 PRINT AT 21,0;"PRESS ANY KE
Y TO CONTINUE"
2090 IF INKEY$="" THEN GOTO 2090
2095 CLS
2097 GOTO 2180
2100 LET HC=SC
2102 CLS
2103 FOR I=1 TO 5
2105 PRINT AT 0,7;"CONGRATULATIO
NS"
2110 PRINT AT 0,7;"CONGRATULATIO
NS"
2120 NEXT I
2130 PRINT AT 3,0;"YOU GOT THE H
IGH SCORE "
2140 PRINT AT 5,0;"ENTER NAME"
2145 PRINT AT 6,0;"(NO MORE THAN
 12 LETTERS)"
2150 INPUT N$
2160 IF LEN N$>=12 THEN GOTO 215
0
2170 CLS
2175 RETURN
2180 PRINT AT 0,0;"SKILL LEVEL"
2190 PRINT AT 3,0;"0=MOVE FORWAR
D ON KEYBOARD"
2195 PRINT AT 4,0;"1=MOVE FORWAR
D COMPULSARY"
2200 INPUT OO
2205 IF INT (OO)<0 OR INT (OO)>1
 THEN GOTO 2180
2210 GOTO 2220
2220 CLS
2230 GOTO 5
3000 SAVE "CHICKEN"
3001 GOTO 1
```



```
100 CALL CLEAR
110 LIFE=5
120 MAN=15
130 CALL CHAR(42,"3838907C3A382828")
140 CALL CHAR(43,"181C1E1710101010")
150 TRY=1
160 GOSUB 800
170 REM  SET HEIGHT (VERTICAL
    DISTANCE BETWEEN GATES)
180 HEIGHT=TRY+14
190 IF HEIGHT<20 THEN 210
200 HEIGHT=17+RND*5
210 REM  SET WIDTH OF GATE
220 WIDTH=10-TRY
230 IF WIDTH>4 THEN 250
240 WIDTH=2+RND*3
250 REM  SET NUMBER OF GATES PER RUN
260 GATES=10+TRY*3
270 REM  SET SCREENBOTTOM
280 BTM=24
290 OFFSET=2
300 REM  OUTER LOOP: ONCE PER RUN
310 FOR INC=1 TO GATES
320 CALL SOUND(-4000,-5,20)
330 REM  SET LEFT GATE
340 LG=INT(RND*(24-WIDTH)+OFFSET)
350 CALL HCHAR(23,LG,43)
360 CALL HCHAR(23,LG+WIDTH,43)
370 REM  INNER LOOP- RUN ONCE PER GATE
380 FOR INC2=1 TO BTM-HEIGHT
390 CALL KEY(3,KEY,STATUS)
400 CALL HCHAR(HEIGHT-1,MAN,32)
410 REM  3 ALWAYS RETURNS UPR CASE
420 IF STATUS=0 THEN 460
430 A=POS("1234567890=",CHR$(KEY),1)+1
```

BY STEPHEN SHAW

SLALOM

RUNS ON A TEXAS TI 99/4a

Slalom racing is for the skier who knows his sport. Only the best can cope with the sweeps and swirls of the giant slalom course. You'll have to be a real cool customer to deal with the dangers that lurk under the snow — like ice or hidden rocks. You must take them all into your stride as you hurtle down the slope at break-neck speeds.

Author Stephen Shaw has come up with a challenging simulation of the real thing. He says runs one to three are fairly easy — easy, for the experienced downhill skier that is! Run four is moderately difficult — which could mean anything from almost fatal to near impossible — but after that the runs get harder!

As this is an Arcade Arena game we'll want to hear about your top scores. Stephen has given us a guide to good scores on his game which we'll pass on to you. If you get over 4,000 then you can consider yourself a good skier — but you'll have to do better if you want to fill in the coupon at the start of this section.

If you score 6,000 then you are on your way to stardom. If you race your way to 8,000 then we want to hear from you! Send us a postcard from the ski resort where you've been practising . . .

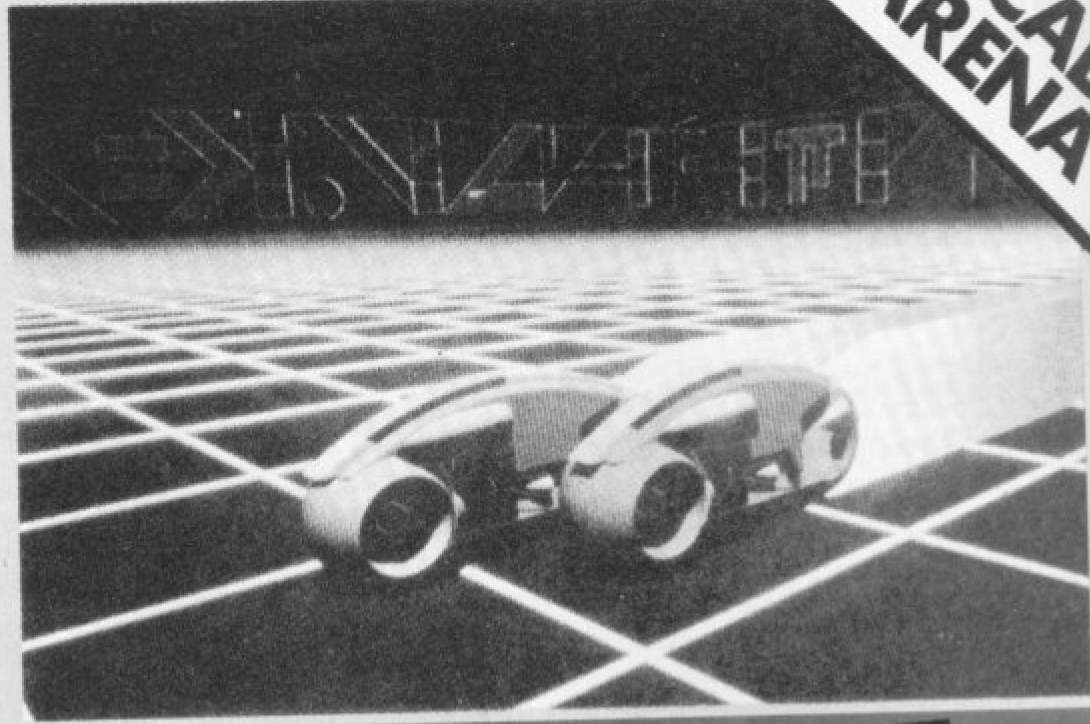
This game will also run in TI Extended Basic. Use the top row of the keyboard to control your skier.

```
440 IF A=1 THEN 460
450 MAN=A*2-1
460 REM
470 CALL HCHAR(HEIGHT,MAN,42)
480 PRINT
490 NEXT INC2
500 REM  TEST TO SEE IF IN GATE
510 IF ABS(MAN-LG-WIDTH/2)
>=WIDTH/2 THEN 520 ELSE 560
520 LIFE=LIFE-1
530 CALL SOUND(-500,110,0,
112,0,250,30,-4,2)
540 IF LIFE=0 THEN 710
550 GOTO 570
```

```
560 SCORE=SCORE+10*TRY
570 NEXT INC
580 SCORE=SCORE+50*TRY
590 PRINT
600 PRINT "SCORE:";SCORE
610 PRINT "LIVES LEFT:";LIFE
620 PRINT "RUN";TRY;" COMPLETED"
630 PRINT
640 PRINT "ANOTHER RUN COMING UP..."
650 PRINT
660 PRINT
670 FOR INC=1 TO RND*500+700
680 NEXT INC
690 TRY=TRY+1
700 GOTO 180
710 CALL CLEAR
720 PRINT "SORRY YOU RAN OUT OF LIVES"
730 PRINT "SCORE:";SCORE
740 PRINT "YOU TERMINATED IN RUN":"NUMBER:";TRY
750 PRINT "AGAIN? PRESS Y"
760 CALL KEY(3,KEY,STATUS)
770 IF KEY=89 THEN 100
780 IF STATUS=0 THEN 760
790 STOP
800 REM  INSTRUCTIONS
810 PRINT "SLALOM RUN"
820 PRINT "COPYRIGHT 1983 S.SHAW"
830 PRINT "FOR C&VG MAGAZINE"
840 PRINT
850 PRINT "IN THIS FAST AND":"INCREASINGLY DIFFIC
ULT GAME"
860 PRINT "YOU MUST SKI BETWEEN SETS OFFLAGS"
870 PRINT "IF YOU HIT A FLAG OR PASS":"OUTSIDE TH
E GATE,YOU LOSE ":"ONE OF FIVE
LIVES."
880 PRINT "SCORE 10 X LEVEL PER GATE":"AND 50 X L
EVEL FOR EACH"
890 PRINT "RUN YOU FINISH ALIVE"
900 PRINT "CONTROL SKIER BY PRESSING ":"KEYS 1 TO
 ="
910 PRINT "1 PLACES SKIER SCREEN LEFT"
920 PRINT "= PLACES SKIER ON RIGHT":"OTHER KEYS I
N BETWEEN"
930 PRINT
940 PRINT "PRESS ENTER TO CONTINUE"
950 INPUT NUL$
960 CALL CLEAR
970 RETURN
980 END
```

Variables

W(4,2) = Direction variable
I = General loop variable
X, Y = Player one's position
Z = Player one's direction
A, B = Player two's position
C = Player two's direction
P1 = Player one's score
P2 = Player two's score
A0 = Right joystick's horizontal movement
A2 = Left joystick's horizontal movement
A1 = Right joystick's vertical movement
A3 = Left joystick's vertical movement



BY LEE MARK HARRISON

LIGHT CYCLES

RUNS ON A DRAGON 32 WITH TWO JOYSTICKS

Remember the motorised gladiators in the Walt Disney movie Tron? They battled it out on the games grid in high powered jet-bikes. The loser didn't come out alive! Now you can brave the challenge of the Light Cycles from the safety of your own micro. Try and send your opponent up a dead end but you'll need quick reactions as the game is very fast — and very playable. Players must not touch the walls of the games grid or their opponents light trace. Each game consists of 25 heats. The computer keeps score and declares the winner.

You must not go back on your own trail. It is best to start the game with your joystick in the neutral position so you don't get wiped out straight away.

```
10 POKE&HFFD7,0:DIMW(4,2):FORI=1TO4:READW(I,1),W(I,2):NEXTI
20 X=21:Y=16:Z=1
30 A=41:B=15:C=3
40 CLS0:FORI=1TO62:SET(I,4,3):SET(I,30,3):NEXTI
50 FORI=4TO30:SET(1,I,3):SET(62,I,3):NEXTI
60 PRINT@1,"score:-Player#1";P1;:PRINT@40,"Player#2";P2;
70 IFINKEY$=""THENGOTO70
80 SET(X,Y,2):SET(A,B,1)
90 X=X+W(Z,1):Y=Y+W(Z,2):A=A+W(C,1):B=B+W(C,2)
100 A0=JOYSTK(0):A1=JOYSTK(1):A2=JOYSTK(2):A3=JOYSTK(3)
110 IFA1>60THENZ=3
120 IFA3>60THENC=3
130 IFA0>60THENZ=2
140 IFA2>60THENC=2
150 IFA1<3THENZ=1
160 IFA3<3THENC=1
170 IFA0<3THENZ=4
180 IFA2<3THENC=4
190 IFPOINT(X,Y)<>0THENP2=P2+1:SOUND230,10:GOTO20
200 IFPOINT(A,B)<>0THENP1=P1+1:SOUND1,10:GOTO20
210 PLAY"T06O05A"
220 IFP1=25ORP2=25THEN250
230 GOTO80
240 DATA0,-1,1,0,0,1,-1,0
250 IFP1>P2 THENCLS0:PRINT"PLAYER#1 IS THE WINNER!":PLAY"T9L9ABCDEFG":GOTO270
260 CLS5:PRINT"PLAYER#2 IS THE WINNER!":PLAY"T9L9GFEDCBA"
270 INPUT"DO YOU WISH TO HAVE ANOTHER GAME";A$:IFA$="YES"ORA$="Y"THENRUN
280 FORI=0TO8:CLSI:PRINT@6,"GOODBYE":NEXTI
```

GRAPHICS

By Garry Marshall

THE ART OF MAKING THINGS FALL APART!

I've just come back from seeing that marvellous film *Tron* again and it sparked off an idea that it might be fun to attempt to develop a program to imitate one of the effects used in the Walt Disney movie.

The sequence from the film that particularly caught my fancy is the one where Flynn reconstructs a Recogniser ship destroyed in battle from its constituent parts that happen to be lying around. He then proceeds to knock bits off it again as he flies it into all sorts of obstacles on his way to rescue Tron! Of course, the graphics capabilities on the average micro cannot match those that the makers of *Tron* used. Hardware or software available to people like us is nowhere near as sophisticated.

However, by using the sprite graphics capabilities of the Texas Instruments TI 99/4a we can plot a spaceship and cause it to disintegrate while remaining in motion the whole time. The diagram shows the initial shape of the ship.

It distintegrates into four parts when a key is pressed and one of these parts divides again when another key is pressed. The diagram also gives the sprite numbers associated with all the fragments in the program. The program that causes the disintegration is above.

```
100 CALL CLEAR
110 S1$ = "FFFFFFFFF0F0F0F0"
120 S2$ = "F0F0F0F0F0F0F0F8FC"
120 S3$ = "FFFFFFFFF0F0F0F0F"
140 S4$ = "0F0F0F0F0F0F0F1F3F"
150 S5$ = "F0F0F0F"
160 S1$ = S1$ &S2$ &S3$ &S4$
170 CALL CHAR (96, S1$)
180 CALL CHAR (97, S2$)
190 CALL CHAR (98, S3$)
200 CALL CHAR (99, S4$)
210 CALL CHAR (100, S5$)
220 CALL MAGNIFY (4)
230 CALL SCREEN (12)
240 CALL SPRITE (# 1, 96, 7, 100, 100,
0, 5)
250 CALL KEY (0, CODE, STATUS)
260 IF STATUS = 0 THEN 250
270 CALL POSITION (# 1, XPOS, YPOS)
```

```
280 CALL MAGNIFIY (2)
290 CALL MOTION (# 1, -1, 4)
300 CALL SPRITE (# 2, 97, 7, XPOS
+16, YPOS, 1, 4)
310 CALL SPRITE (# 3, 98, 7, XPOS
YPOS+16, -1, 6)
320 CALL SPRITE (# 4, 99, 7, XPOS +
16, YPOS+16, 1, 6)
330 CALL KEY (0, CODE, STATUS)
340 IF STATUS = 0 THEN 330
350 CALL POSITION (# 1, XPOS, YPOS)
360 CALL DELSPRITE (# 1)
370 CALL SPRITE (# 5, 100, 7, XPOS,
YPOS, -2, 3)
380 CALL SPRITE (# 6, 100, 7,
XPOS+16, YPOS, 2, 3)
390 CALL SPRITE (# 7, 100, 7, XPOS,
YPOS+16, -2, 7)
400 GOTO 400
```

The program makes good use of the CALL MAGNIFY command. We could have plotted the initial spaceship as a single character and then made its fragments sprites all based on a single character too. But since each character is based on an 8 x 8 dot matrix, by the time the second splitting has occurred the parts will inevitably be rather small.

By using CALL MAGNIFY(4) we can define a sprite as a block of four characters which is then magnified by a factor of two before it is plotted. In this way the sprite occupies a block of four by four character positions and is really quite large.

With CALL MAGNIFY (2) sprites consist of only one character but are plotted at double size. The program takes advantage of this to produce four single character sprites for the fragment that are equivalent to the original four character sprite.

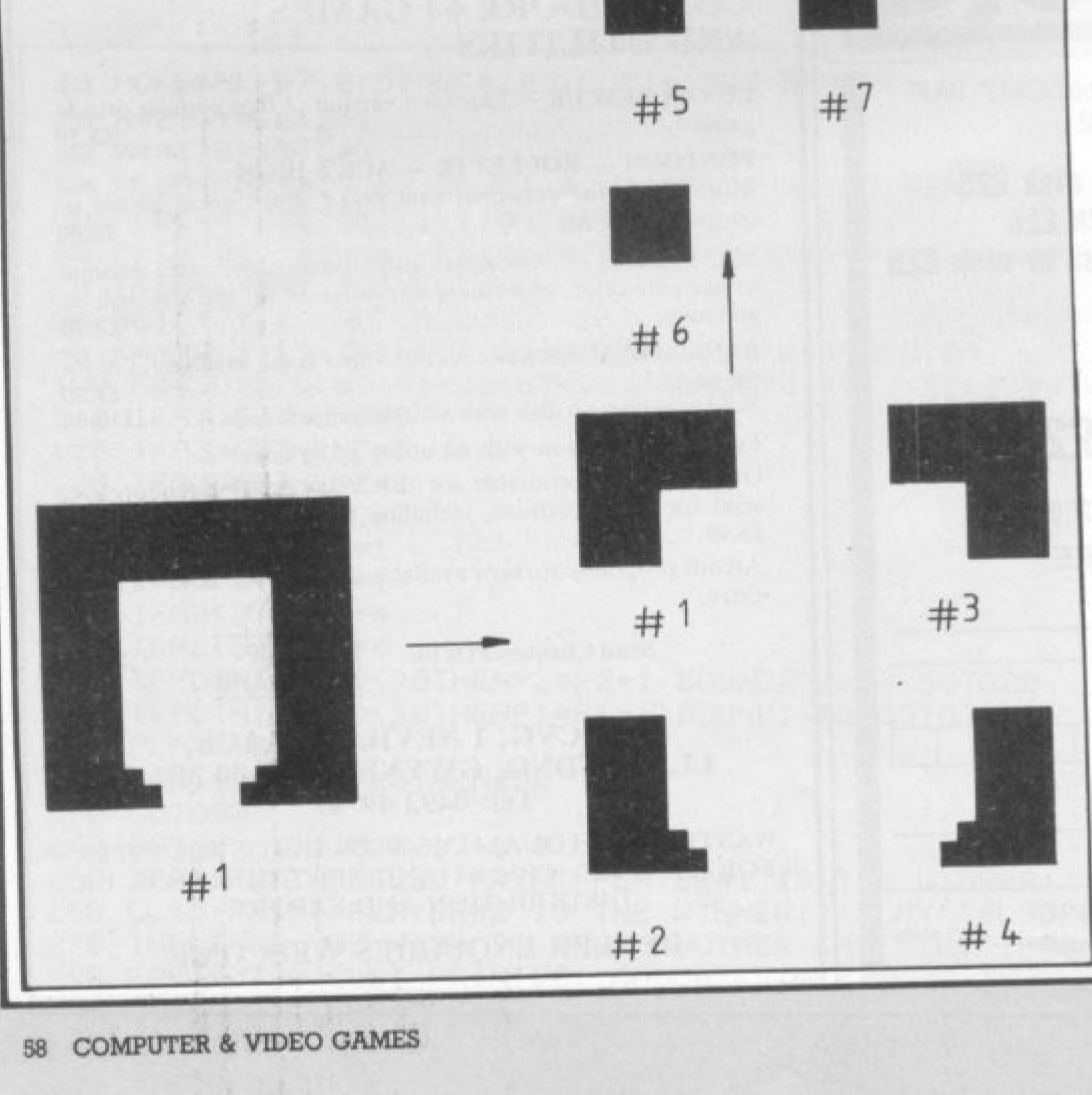
Giving them different velocities makes the fragments of the ship fly apart. Note that in changing from CALL MAGNIFY (4) to CALL MAGNIFY (2) sprite # 1 changes from a four-character sprite to a single character one as shown in the diagram.

The second fragmentation is accomplished by deleting the sprite corresponding to the top left fragment and replacing it by three sprites all defined on a single character so that their combined shapes are equivalent to that of the one they replace. Giving these new sprites yet further different velocities causes the further disintegration.

The CALL POSITION subprogram is used to find the position of a sprite just before it disintegrates so that its fragments can initially appear in the same position.

It is necessary to use a small offset for some of the fragments since this subprogram returns to the position of the top left point of the sprite. The subprogram CALL MOTION is used to change the motion of sprite # 1.

You might find it interesting to use this program as the basis of a number of variations.



sinclair special

4





Inside...
Two special offers...
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Welcome to another Sinclair Special. Even if you're not yet a Sinclair owner, I believe you'll find something of interest in this latest issue.

For instance, if you're looking for the best way to begin computing, turn to our back page. You'll see that leading Sinclair retailers are now offering the popular ZX81, complete with a 16K RAM Pack *and* a free software cassette, all for £45. That means savings of at least £29 on one of the world's all-time best-selling computers.

Those same retailers are also offering the ZX Printer at its regular price of £39.95, but accompanied by a *free* 5-roll Paper Pack, worth £11.95.

If you want to add even more speed and versatility to your ZX Spectrum system, you'll be pleased to hear that the new ZX Microdrive has now been officially announced.

Microdrives are being released on an order of priority basis. Spectrum owners who purchased direct from us will be sent order forms, in a series of mailings that begin with the earliest names on our list of Spectrum owners. If you didn't buy direct from us by mail order, send us your name and address (use the coupon in this Sinclair Special). We'll add your name to the list, and send you a colour brochure and details on how to order.

Finally, if you're looking for more ways to use your ZX system, take a look at the software opposite. There are programs for programmers, a space-chase and car race for arcade-game players, a brand new logic game for those who've exhausted 'the cube'.

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You'll see what I mean about Sinclair having something for everyone. And we'll have even more to show you at two forthcoming exhibitions: the PCW Show at the Barbican Centre, from September 28th to October 2nd, and the Great Home Entertainment Spectacular at Olympia, from September 17th to 25th.

Nigel Searle

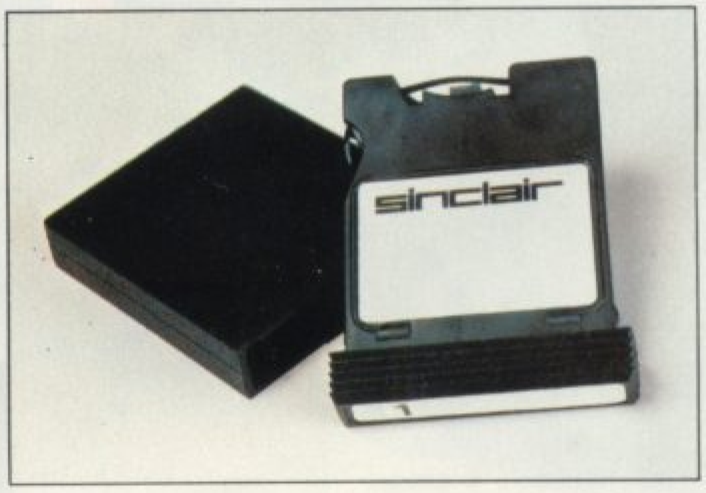
Nigel Searle, Managing Director
Sinclair Research Ltd.

ZX Microdrive System preview!



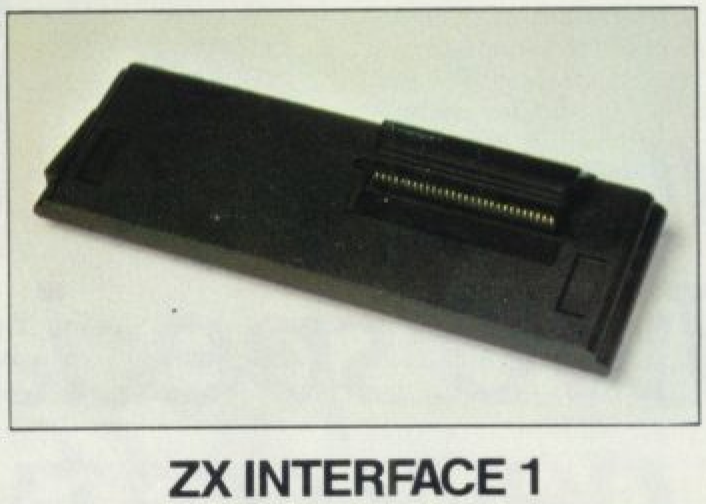
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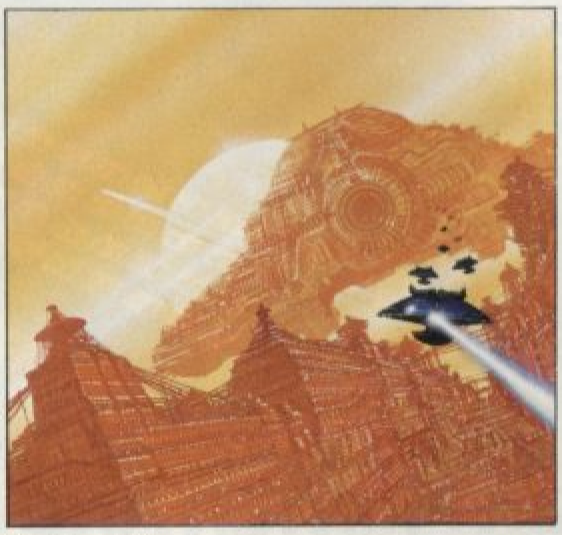
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For 48K RAM Spectrum. **£6.95**

Have you ever wanted to drive a Formula One car flat-out round a Grand Prix circuit? With Chequered Flag you'll need one eye on the road and one eye on the instruments, as you steer and brake to avoid hazards, and work through the gears in search of the lap or race record. This outstanding new program puts you in the driver's seat with stunning realism, and gives you a choice of three cars and ten different circuits. Don't crash!



Mothership
For ZX81 with 16K RAM. **£4.95**

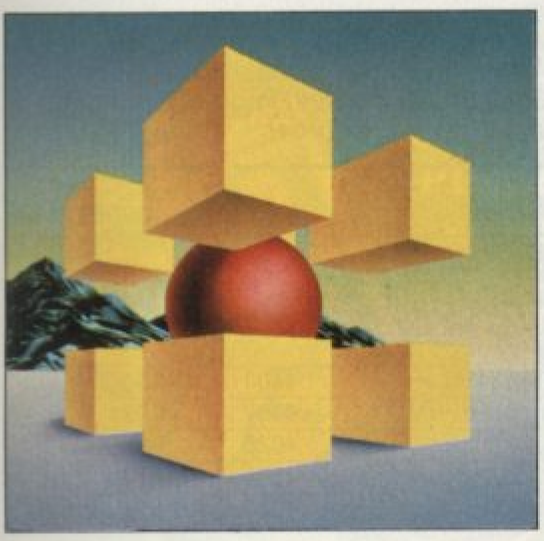
Scream down the claustrophobic confines of the Zarway. Engage suicidal drone fighters in deadly laser combat. Dodge, duck and dive in a high-speed 3-D race to attack the evil Mothership before she claims your home planet. Mothership is a truly tough challenge, and fast, furious fun!



Cattell IQ Test
For 48K RAM Spectrum. **£12.95**

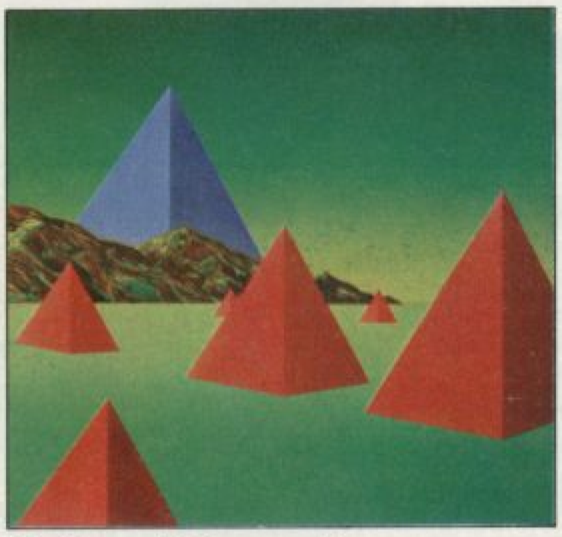
Although there are a number of so-called self-administered IQ tests on the market, the only reliable way of finding your IQ has – until now – been to visit a qualified psychologist and take a battery of tests – for a fee. Now Victor Serebriakoff, International President of Mensa, has produced Professor Cattell's test in a form which enables you to use your ZX Spectrum to test your IQ.

The Cattell Scale IIIA test is timed by the computer, marked immediately, and the marks standardised against your age. This is the first time that an accredited, standardised test has been available to the general public.



Zeus Assembler
For 48K RAM Spectrum. **£12.95**

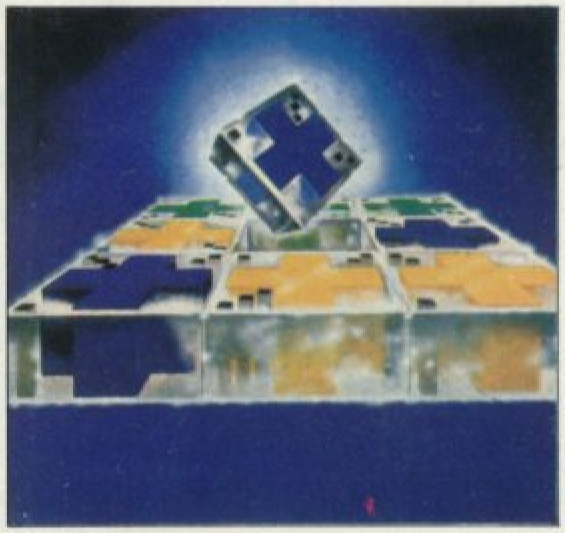
A powerful and easy-to-use programming aid, designed to simplify the entire process of producing machine code programs, enabling you to write in assembly language instructions. Comes complete with comprehensive range of support facilities.



Monitor and Disassembler
For 16K & 48K RAM Spectrums. **£12.95**

This powerful Disassembler translates machine code into comprehensible assembly language instructions, allowing you to examine the BASIC ROM, to investigate the workings of the Spectrum or to analyse your own machine code routines.

With the highly versatile Monitor, you get an extensive set of facilities to aid the entry, inspection, modification and debugging of your own machine code programs.



Flippit
For 16K or 48K RAM Spectrums. **£9.95**

Like those cube games, Flippit looks simple. But its fiendish ingenuity results in the ultimate game of logic and patience. Twist, turn and swap the nine Flippit pieces in search of the elusive magic square. But be warned, those pieces can be arranged in *millions* of combinations...

TERMINAL SOFTWARE



Regular readers of Computer & Video Games will remember that last month we unveiled what we called THE BEST GAMES YET FOR THE Commodore 64 We still haven't seen anything to beat them.

SUPER SKRAMBLE! is the definitive 64 version of the original arcade classic that uses all the 64's best facilities.

SUPER GRIDDER is a novel, exciting and compulsively tactical arcade-style game with superb SPRITE graphics.

SUPERDOG FIGHT is the FIRST 64 games cassette to have simultaneous two-player action.

More are on the way . . .

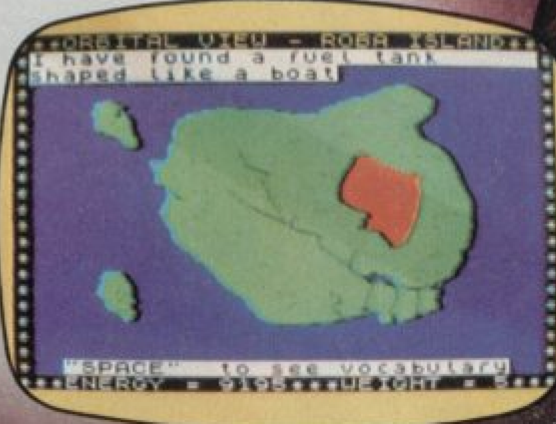
Rec. Price **£9.95**

This month we unveil our range for the Sinclair Spectrum 48k. Three games that every enthusiast will want to possess.

SPACE ISLAND and **VAMPIRE VILLAGE** are unique and exciting replayable graphic adventures.

CITY is what we call a real time computerised better-than-a -board game . . . find out why.

All great value at Rec. Price **£6.95**





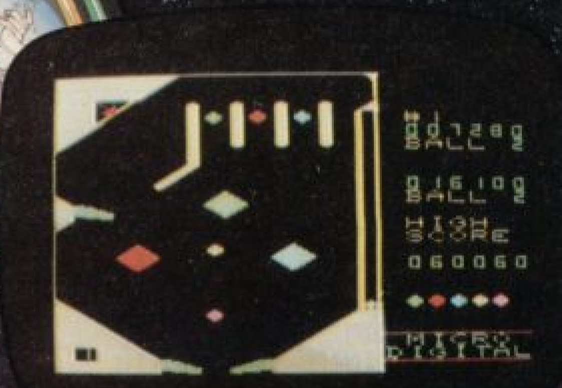


VIC 20 owners have something new and very special to look forward to as well.

PINBALL WIZARD is a wonder of simulation that makes unsurpassed use of the VIC's graphics.

PURE ENJOYMENT on cassette for the UNEXPANDED VIC 20.

Rec. Price **£7.95**



There are TWELVE more Terminal Software games cassettes.

Rec. Prices from **£5.95** to **£9.95**

TERMINAL

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```
5 DIMA(25),S(5),V(5),I(3),IN(3),WF(15),FR(15),GH(15),BB(5)
6 FORVV=1TO15:FR(VV)=207:NEXTVV
7 MN=6:MF=206:T=1:V(1)=-40:V(2)=40
8 IN(1)=1:IN(2)=-1
9 H=0:PF=0
10 PRINT"[graphics]"
20 PRINT"[graphics]"
30 PRINT"[graphics]"
40 PRINT"[graphics]"
50 PRINT"[graphics]"
60 PRINT"[graphics]"
70 PRINT"[graphics]"
80 PRINT"[graphics]"
90 PRINT"[graphics]"
95 PRINT"[graphics]    The"
97 PRINT"[graphics]"
99 PRINT"[graphics]"
100 PRINT"[graphics]"
110 PRINT"[graphics]"
120 PRINT"[graphics]"
130 PRINT"[graphics]"
140 PRINT"[graphics]"
150 PRINT"[graphics]"
160 PRINT"[graphics]"
170 PRINT"[graphics]"
180 PRINT"[graphics]"
190 PRINT"[graphics]"
200 PRINT"[graphics]"
```

```
201 FORG=1TO15:READWF(G):NEXTG
202 DATA53873,53777,53637,53560,53534,53298,53304,53310,53316,53322,53292
203 DATA53814,53840,53577,53593
205 TEMPO7:MUSIC"C9R1C9R4F9R8F9#E9G9R5G9#B9R8A8F9"
210 FORD=1TO15:READGH(D):NEXT
211 DATA 53793,53717,53842,53562,53402,53396,53513,53390,53384,53378,53372
212 DATA 53532,53812,53779,53579
215 PRINT"[graphics]"
220 B=0:FORN=1TO24:READA(N):POKE53535+B,A(N):B=B+1:NEXTN
230 DATA 2,25,0,13,1,18,20,9,14,0,102,0,7,12,25,14,0,19,14,15,23,4,5,14
240 FORA=1TO1000:NEXTA
250 DIMP(11),U(11),K(4),L(4)
260 FORA=1TO11:READP(A):NEXTA
270 FORFF=1TO11:READU(FF):NEXTFF
280 DATA 53424,53504,53502,53862,53864,53944,53956,53756,53750,53430,53434
290 DATA40,-1,40,1,40,1,-40,-1,-40,-1,40
300 PRINT"[graphics] Do you require instruction's (Y/N)."
305 GETA$:IFA$=""THEN305
310 IFA$="N"THENGOTO1000
320 IFA$="Y"THEN335
330 GOTO305
335 PRINT"[graphics]        ESCAPE FROM THE BASTILLE        "
337 PRINT"                        "
340 PRINT"There are 15 cells in the BASTILLE."
350 PRINT"Ten cells contain FRENCH ARISTOCRAT'S,"
360 PRINT"Five cells contain booby traps."
370 PRINT"The object of the game is to rescue the"
380 PRINT"aristocrat's from their cells avoiding"
390 PRINT"the GUARDS (";CHR$(105);").The guards are "
400 PRINT"constantly patrolling the corridors or"
405 PRINT"have set booby traps in the cells"
410 PRINT"There are Six PARTISANS (";CHR$(99);") who in turn"
420 PRINT"try to free the aristocrat's."
422 PRINT"When a partisan (";CHR$(99);")lands on a aristocrat";
424 PRINT"the character changes to (";CHR$(103);") and moves  to FREEDOM";
426 PRINT" through the gate.([graphics])"
428 PRINT"You score 100 Points for every freed"
429 PRINT"aristocrat."
430 PRINT"If a partisan is caught in a booby trap"
435 PRINT"or in a corridor he is EXECUTED!!!!"
450 PRINT"[graphics]        Press <SPACE> Bar to start"
460 GETA$:IFA$=" "THEN GOTO470
465 GOTO460
470 PRINT"[graphics]The controls are:-"
480 PRINT"[graphics]                    W"
490 PRINT"                    ↑"
500 PRINT"                    |"
510 PRINT"                A←";CHR$(99);"→D"
520 PRINT"                    |"
530 PRINT"                    ↓"
540 PRINT"                    X"
600 PRINT"[graphics]Press <SPACE> bar to start"
610 GETB$:IFB$=" "THEN GOSUB1000:GOTO750
625 GOTO610
750 GOTO1200
```

Illustration: Terry Rogers

```
1000 PRINT"[graphics]"
1005 PRINT"[graphics]"
1010 PRINT"[graphics]"
1015 PRINT"[graphics]"
1020 PRINT"[graphics]"
1025 PRINT"[graphics]"
1030 PRINT"[graphics]"
1035 PRINT"[graphics]"
1040 PRINT"[graphics]"
1045 PRINT"[graphics]"
1050 PRINT"[graphics]"
1055 PRINT"[graphics]"
1060 PRINT"[graphics]"
1065 PRINT"[graphics]"
1070 PRINT"[graphics]"
1075 PRINT"[graphics]"
1080 PRINT"[graphics]"
1085 PRINT"[graphics]"
1090 PRINT"[graphics]"
1095 PRINT"[graphics]"
1100 PRINT"[graphics]"
1120 FORH=1TO15:POKEWF(H),FR(H):NEXTH
```



BY MARTIN AND GLYN SNOWDEN

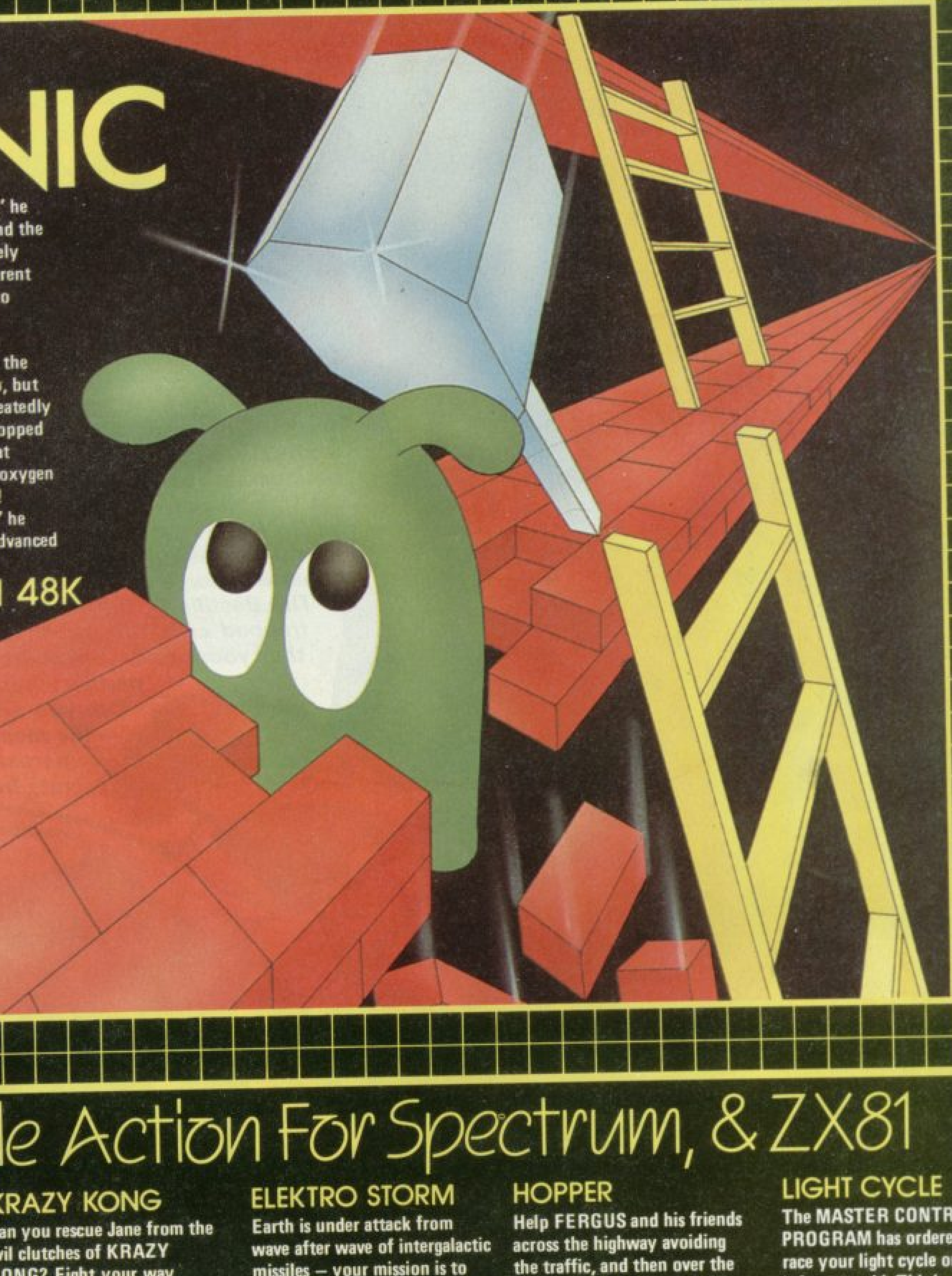
RUNS ON A SHARP MZ80K IN 8K

ESCAPE from the BASTILLE

They seek him here, they seek him there, that damned elusive Pimpernel! Join us on a trip back into history and the troubled times of the French Revolution. The aristocrats live in fear and many have been imprisoned in that bleak fortress — The Bastille. Here they await their fate at the blade of Madame Guillotine! Can you help the aristocrats escape to freedom? Lead the partisan force on a rescue mission into the heart of The Bastille — but beware the guards and booby trapped cells! If you get caught you'll lose more than your pride—the guillotine awaits any unlucky partisan captured on the mission. Can you aid the Scarlet Pimpernel — the most feared member of the partisans — and save the aristocrats from death and disgrace?

```
1200 G=223:F=207:TI$="000000":MP=54027:M=202
1205 MF=206:T=1:V(1)=-40:V(2)=40
1206 IN(1)=1:IN(2)=-1
1210 FORMM=1TO5
1220 X=INT(RND(1)*15)+1
1230 BB(MM)=GH(X):NEXT
1235 S(1)=53725:S(2)=53689
1240 I(1)=53987:I(2)=53433
1300 POKE10407,0:POKE10167,1
1310 POKEMP,0:GETA$:H=0
1312 H=0
1313 IFBB(5)=MPTHENWW=5:GOTO2000
1315 IF(MP=S(1))+(MP=S(2))+(MP=S(3))+(MP=I(1))
+(MP=I(2))+(MP=I(3))THENGOTO3000
1316 IFBB(4)=MPTHENWW=4:GOTO2000
1317 IFBB(1)=MPTHENWW=1:GOTO2000
1318 IFBB(2)=MPTHENWW=2:GOTO2000
1319 IFBB(3)=MPTHENWW=3:GOTO2000
1320 IFA$="A"THENH=-1:MUSIC"A0"
1330 IFA$="D"THENH=1:MUSIC"A0"
1340 IFA$="X"THENH=40:MUSIC"D0"
```

PANIC



"It must be a nightmare" he screamed as he ran around the maze of floors, desperately climbing ladders to different levels in a vain attempt to evade the monsters.
He had only his neutron hammer to dig holes for the vile creatures to fall into, but even then he had to repeatedly hit them before they dropped to their deaths. As if that wasn't bad enough, the oxygen supply was running out!
"It's simply impossible" he wailed as the monsters advanced on all sides. .

SPECTRUM 48K
£5·95

Arcade Action For Spectrum, & ZX81

MAZE DEATH RACE

Drive your 500b.h.p. racing car around a giant maze (9 times the size of the TV screen on the ZX81 version, 32 times for the spectrum). Watch out for the hazards – oil, ice, fallen rocks etc. Not the least of your worries are the chase cars also in the maze – one touch with these means instant death!

ZX81 16K 3·95
SPECTRUM 48K 4·95



KRAZY KONG

Can you rescue Jane from the evil clutches of KRAZY KONG? Fight your way through three screens of fire-balls, barrels and conveyor belts to the top of the girders and save the damsel in distress. Entirely written in machine code to give super fast arcade action.

ZX81 16K 3·95
SPECTRUM 48K 5·95



ELEKTRO STORM

Earth is under attack from wave after wave of intergalactic missiles – your mission is to blast them out of the sky with your laser cannon before the whole human race is wiped out.

SPECTRUM 48K 5·95



HOPPER

Help FERGUS and his friends across the highway avoiding the traffic, and then over the treacherous river on the backs of turtles and logs to the safety of the lilly pond.
Features include: 6 lanes of traffic, diving turtles, croco-diles & flies.

ZX81 16K 3·95
SPECTRUM
16K 48K 5·95



LIGHT CYCLE

The MASTER CONTROL PROGRAM has ordered you to race your light cycle on the infamous grid. This is an incredibly fast, adrenalin pumping game that is very addictive. There is an option to race against either another player or the computer – but we warn you its very very good!

SPECTRUM
16K 48K 5·95



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```
1350 IFA$="W"THENH=-40:MUSIC"E0"
1360 MP=MP+H
1361 IFMP=WF(1)THENFR(1)=0
1362 IFMP=WF(2)THENFR(2)=0
1363 IFMP=WF(3)THENFR(3)=0
1364 IFMP=WF(4)THENFR(4)=0
1365 IFMP=WF(5)THENFR(5)=0
1366 IFMP=WF(6)THENFR(6)=0
1367 IFMP=WF(7)THENFR(7)=0
1368 IFMP=WF(8)THENFR(8)=0
1369 IFMP=WF(9)THENFR(9)=0
1370 IFMN<1THENGOTO3000
1371 IFMP=WF(10)THENFR(10)=0
1372 IFMP=WF(11)THENFR(11)=0
1373 IFMP=WF(12)THENFR(12)=0
1374 IFMP=WF(13)THENFR(13)=0
1375 IFMP=WF(14)THENFR(14)=0
1376 IFMP=WF(15)THENFR(15)=0
1380 IF(PEEK(MP)=163)*(M<>206)THENMP=MP-H
1400 IF(PEEK(MP)=163)+(PEEK(MP)=206)THENGOTO4000
1410 IFPEEK(MP)=FTHENM=MF
1420 IF(PEEK(MP)=208)+(PEEK(MP)=166)THENMP=MP-H
1423 IF(PEEK(MP)=223)THENGOTO3000
1430 POKEMP,M
1440 FORSS=1TO2
1442 POKES(SS),0
1450 IFS(SS)=53445THENV(SS)=-1
1460 IFS(SS)=53409THENV(SS)=40
1470 IFS(SS)=53929THENV(SS)=1
1480 IFS(SS)=53965THENV(SS)=-40
1490 S(SS)=S(SS)+V(SS)
1500 POKES(SS),G:NEXTSS
1505 POKEI(1),0
1507 IFMP=I(1)THENGOTO3000
1510 IFI(1)=53430THENIN(1)=-1
1515 IFI(1)=53424THENIN(1)=40
1520 IFI(1)=53984THENIN(1)=1
1525 IFI(1)=53990THENIN(1)=-40
1540 I(1)=I(1)+IN(1):POKEI(1),G
1550 POKEI(2),0
1560 IFMP=I(2)THENGOTO3000
1570 FORXX=1TO11
1580 IFI(2)=P(XX)THENIN(2)=U(XX)
1590 NEXTXX
1670 I(2)=I(2)+IN(2)
1680 POKEI(2),G
```



```
1870 PRINT"■■■■■■■■■■■■■■■■■■■■■■■■SCORE";SC
1880 PRINT"■■■■■■■■■■■■■■■■■■■■■■■■SURVIVING PARTISANS=";MN
1890 PRINT"ARISTOCRATS FREED=";PF
1900 GOTO1310
2000 PRINT"■*******Fooled 'AGAIN' I am a SPY*******"
2001 FORA=1TO500:NEXTA
2004 FORA=1TO5
2005 POKEMP-1,227:POKEMP+1,227:POKEMP,166:POKEMP+40,238:POKEMP-40,238
2010 POKEMP-1,0:POKEMP+1,0:POKEMP+40,0:POKEMP-40,0:POKEMP,0
2020 FORVC=1TO50:POKE4514,VC:USR(68):NEXTVC
2030 USR(71)
2035 NEXTA
2040 FORA=1TO2000:NEXTA
3000 PRINT"■Your man has been caught and he is      going to be executed!!!"
3010 PRINT"          ▒▒▒.▒▒▒ "
3020 PRINT"          ▌  |  ▐ "
3030 PRINT"          ▌▒▒▒▒▒▐ "
3040 PRINT"          ▌\    ▐ "
3050 PRINT"          ▌ \   ▐ "
3060 PRINT"          ▌  \  ▐ "
3070 PRINT"          ▌   \ ▐ "
3080 PRINT"          ▌     ▐ "
3090 PRINT"          ▌     ▐ "
3100 PRINT"          ▌     ▐ "
3110 PRINT"          ▌     ▐ "
3120 PRINT"          ▙_____▟ "
3130 PRINT"          ▒▒ ▒ ▒▒ "
3140 PRINT"          ▒▒ █ ▒▒ "
3150 PRINT"          ▒▒▄▄▄▒▒ "
3160 PRINT"          ▒▒▒▒▒▒▒ "
3170 PRINT"          ▒▒▒▒▒▒ "
3180 PRINT"          ■■■■■■■■■■■■■"
3190 FORA=1TO1500:NEXT
3200 O=0:Y=0:E=0:SD=0:JK=0:WE=0:OP=0:UI=0:YT=0:KL=0:RT=0:J=0
3210 FORA=1TO7:POKE53420+O,0:POKE53460+Y,0:POKE53500+E,0
3220 POKE53540+SD,0:POKE53580+JK,0:POKE53620+KL,0
3230 O=O+1:Y=Y+1:E=E+1:SD=SD+1:JK=JK+1:KL=KL+1:NEXT
3240 FORA=1TO9:POKE53423+RT,121:RT=RT+40:NEXT
3250 FORA=1TO7:POKE53780+J,166:J=J+1:NEXT
3260 FORA=1TO4:POKE53821+OP,0:POKE53861+UI,0:POKE53901+YT,0
3265 OP=OP+1:UI=UI+1:YT=YT+1:NEXT
3270 POKE53821,160:POKE53862,169:POKE53862+1,160:POKE53862+42,169
3280 POKE54021,156:POKE54022,157:POKE54023,158:POKE54024,159
3290 PRINT"■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■Ouch!!!!!"
3291 TEMPO4
3292 MUSIC"C6R2C4R1C4R1C6R1#D4R1D4R1D4R1C4R1C4_B4R1C6"
3293 FORA=1TO3000:NEXT
3295 MN=MN-1
3300 IFMN<1THENPRINT"■■■■■■You have no men left the revolutionaries have won"
3310 IFMN<1THENPRINT"■SCORE=";SC
3320 IFMN<1THENEND
3330 GOTO1000
3500 END
4000 IFINT(RND(1))>8THENGOTO3000
4010 SC=SC+100:PF=PF+1
4020 P=54027:M=202:MP=P:GOTO1310
```



BY S. CITYNSKYJ

RUNS ON AN APPLE II EUROPLUS

IN 48K

STARDUST



Catch some falling stardust and store it in your spaceship" runs a line in a little song favoured by space pilots. And strangely enough that's just what you have to do in our latest cosmic challenge.

The theme is straightforward enough. You must steer your spacecraft around the universe collecting stardust. There is a hazard however — giant moon-rocks are whizzing around you in an extremely dangerous manner. These rocks get ever more numerous as you move further into the game. There is also a constant battle to avoid running out of fuel. To help you keep going, starbases appear randomly during the game which you must dock with if your fuel supply is to be replenished.

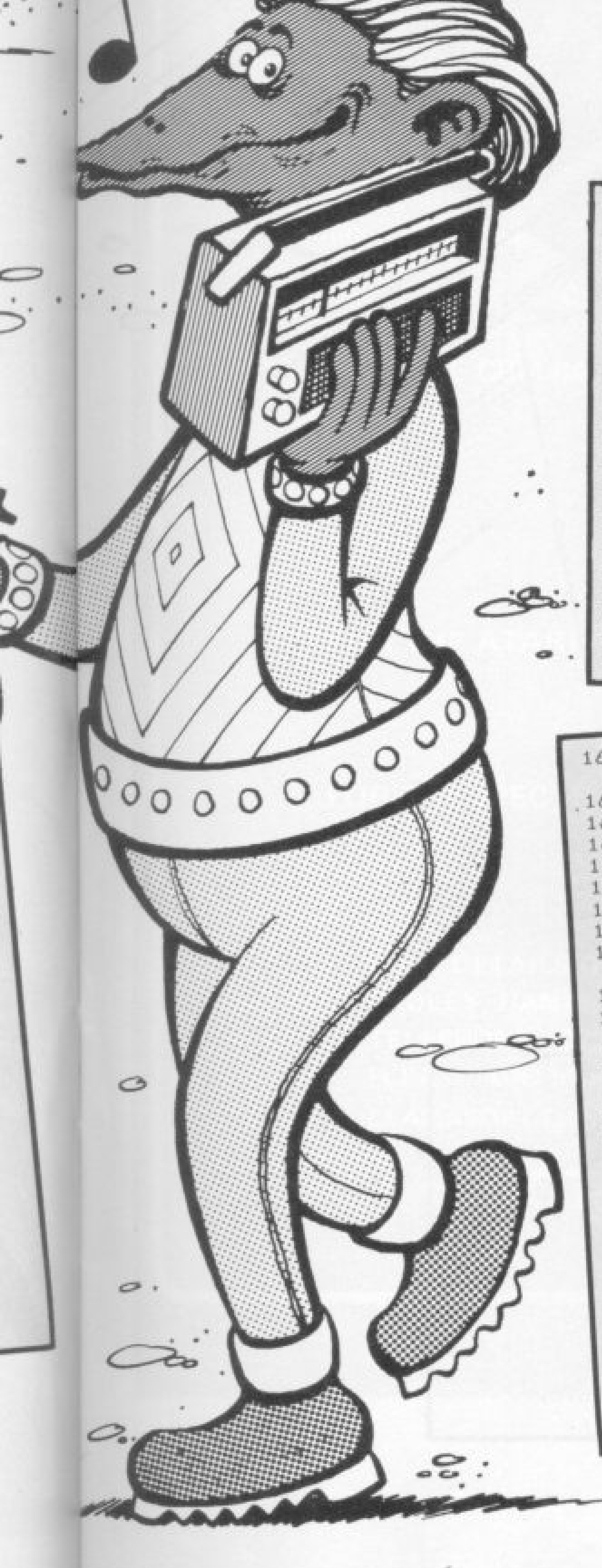
Full instructions are included in the program. Although the game uses colour graphics it can be run using a black and white screen. If you don't have colour then change the variables in line 183 which should then read: CI=II: C3=9: C4=5: C5=15. This will ensure better screen clarity.

FL = Fuel supply
LK = Fuel leak per move
TG = Number of stardust presently on board
TA = Total of stardust at game start
X = Horizontal position of ship
Y = Vertical position of ship
SC = Score
SA = High score
M = Keyboard strobe location in memory
C1 = Colour of ship
C1 = Black (0)
C3 = Colour of base
C4 = Colour of moondust
C5 = Colour of stardust
AA = Used in game end flash effect
J = Used to set value of stardust and moon-dust location
I = General loop variable
AX = Random horizontal location of stardust, moon-dust and base
AY = Random vertical location of stardust, moon-dust and base
II = Loop variable used in clearing board
A = Board array and used to read data for sound
A$ = Yes/no question reply

Illustration: Terry Rogers

```
100  GOTO 182
101  COLOR= C2: PLOT X,Y:X = X + 1
102  IF  PEEK (M) = 218 THEN Y = Y - 1: REM 'UP'
103  IF  PEEK (M) = 216 THEN Y = Y + 1: REM 'DOWN'
104  IF  PEEK (M) = 155 THEN 106: REM 'HYP'
105  GOTO 111
106  POKE 769,4: POKE 768,200: CALL 770: POKE 769,4: POKE 768,100: CALL 77
     0
107 FL = FL - (LK + 40)
108  INVERSE : VTAB 23: PRINT FL;: NORMAL : PRINT " "
109 X =  INT (37 * ( RND ( RND (1)))) + 1:Y =  INT (37 * ( RND ( RND (1)))
     ) + 1
110  GOTO 114
111  IF X > 38 THEN X = 1
112  IF Y < 1 THEN Y = 38
113  IF Y > 38 THEN Y = 1
114  COLOR= C1: PLOT X,Y
115 FL = FL - LK: IF FL < 1 THEN 164
116  IF FL < 1000 THEN  INVERSE
117  VTAB 23: PRINT FL;: NORMAL : PRINT " "
118  IF A(X,Y) = 1 THEN 123: REM 'STAR-DUST'
119  IF A(X,Y) = 2 THEN 137: REM 'MOON-DUST'
120  IF A(X,Y) = 3 THEN 141: REM 'BASE'
121  GOTO 101
122  REM ***HIT STAR-DUST***
123 SC = SC + 10
124 TG = TG - 1: IF TG = 0 THEN 130: REM ADD MORE TO BOARD & SCORE
125  POKE 769,10: POKE 768,100: CALL 770: REM JINGLE
126 A(X,Y) = 0
127  VTAB 21: PRINT SC
```

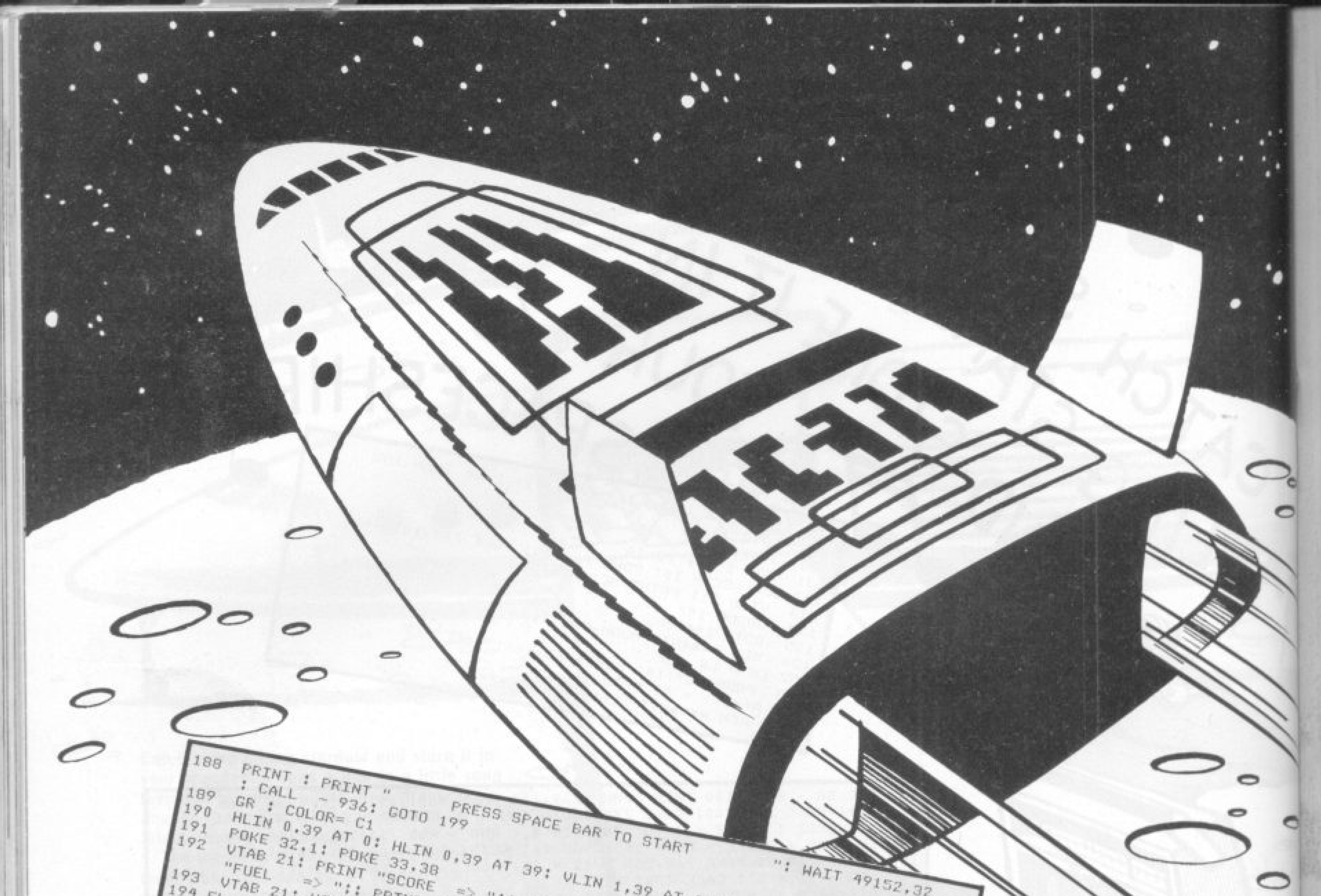
CATCH SOME FALLING STARDUST AND STORE IT IN YOUR SPACESHIP



```
> 30 THEN 158
128  IF (40 * ( RND ( RND (1))))
129  GOTO 101
130  INVERSE
131  FOR I = 1 TO TA
132 SC = SC + 10: POKE 769.10: POKE 768.10: CALL 770
133  VTAB 21: PRINT SC: NEXT I
134  GOSUB 147
135  GOTO 101
136  REM ****HIT MOON-DUST****
137 LK = LK + 1
138  POKE 769.10: POKE 768.180: CALL 770
139 A(X.Y) = 0: GOTO 101
140  REM ****HIT SERVICE BASE****
```

```
141  IF SC - SA < 100 THEN  POKE 769.10: POKE 768.100: CALL 770: POKE 769.
     10: POKE 768.200: CALL 770: GOTO 145
142  INVERSE : FOR I = 1 TO  INT (24 * ( RND ( RND (1)))) + 1
143 SC = SC + 20:FL = FL + 20: VTAB 21: PRINT SC: VTAB 23: PRINT FL
144  POKE 769.8: POKE 768.255 - (I * 10): CALL 770: POKE 769.8: POKE 768.2
     55 - (I * 5): CALL 770: NEXT I
145 A(X.Y) = 0: NORMAL : VTAB 21: PRINT SC: VTAB 23: PRINT FL:SA = SC: GOTO
     101
146  REM ****SET UP BOARD****
147 TG = TG + 5:TA = TG: COLOR= C5
148  FOR I = 1 TO TG
149  POKE 769.10: POKE 768.AX: CALL 770
150 AX =  INT (37 * ( RND ( RND (1)))) + 1
151 AY =  INT (37 * ( RND ( RND (1)))) + 1
152  IF A(AX.AY) > 0 THEN 150
153 A(AX.AY) = J: PLOT AX.AY: NEXT I
154  IF J = 2 THEN 156
155 J = 2:TG = TG + 10: COLOR= C4: GOTO 148
156 J = 1:TG = TA: RETURN
157  REM ****CREATE SERVICE BASE****
158 AX =  INT (37 * ( RND ( RND (1)))) + 1
159 AY =  INT (37 * ( RND ( RND (1)))) + 1
```

```
160  IF A(AX.AY) > 0 THEN 101: REM TERMINATE BASE CREATION IF SPACE ALREAD
     Y OCCUPIED
161 A(AX.AY) = 3: COLOR= C3: PLOT AX.AY
162  POKE 769.10: POKE 768.10: CALL 770: GOTO 101
163  REM ****GAME END ROUTINE****
164  POKE 32.1: POKE 33.38: CALL  - 936
165  FOR I = 0 TO 40
166 AA = AA *  - 1: IF AA =  - 1 THEN  INVERSE
167  IF AA = 1 THEN  NORMAL
168  VTAB 21: PRINT "          RESERVOIR EMPTY            ": NEXT I:AA =
     1
169  IF SC <  = HI THEN 171
170  FLASH : VTAB 22: PRINT  SPC( 38): PRINT : VTAB 22: PRINT "   NEW HI-S
     CORE => ";SC;" UNITS":HI = SC: INVERSE : GOTO 172
171  VTAB 22: PRINT  SPC( 38): PRINT : VTAB 22: PRINT "   YOUR SCORE IS ";
     SC;" UNITS"
172  VTAB 23: PRINT "   DO YOU WANT TO PLAY AGAIN Y/N ?     "
173  VTAB 1: HTAB 38: GET A$
174  IF  ASC (A$) = 78 THEN 186
175  IF  ASC (A$) <  > 89 THEN 173
176  CALL  - 936: VTAB 22: PRINT "  PLEASE WAIT WHILE BOARD IS RESET      "
177  COLOR= C2
178  FOR I = 1 TO 38
179  FOR II = 1 TO 38
180 A(II.I) = 0: PLOT II.I: NEXT II: NEXT I
181  GOTO 191
182  DIM A(39.39)
183 M =  - 16384:C1 = 11:C3 = 7:C4 = 4:C5 = 5:AA = 1:J = 1
184  SPEED= 255
185  FOR I = 770 TO 792: READ A: POKE I.A: NEXT I: REM POKE SOUND IN
186  TEXT : CALL  - 936
187  INVERSE : VTAB 15: PRINT "ST A R - D U S T.  S.CITYNSKYJ - 1983."
```



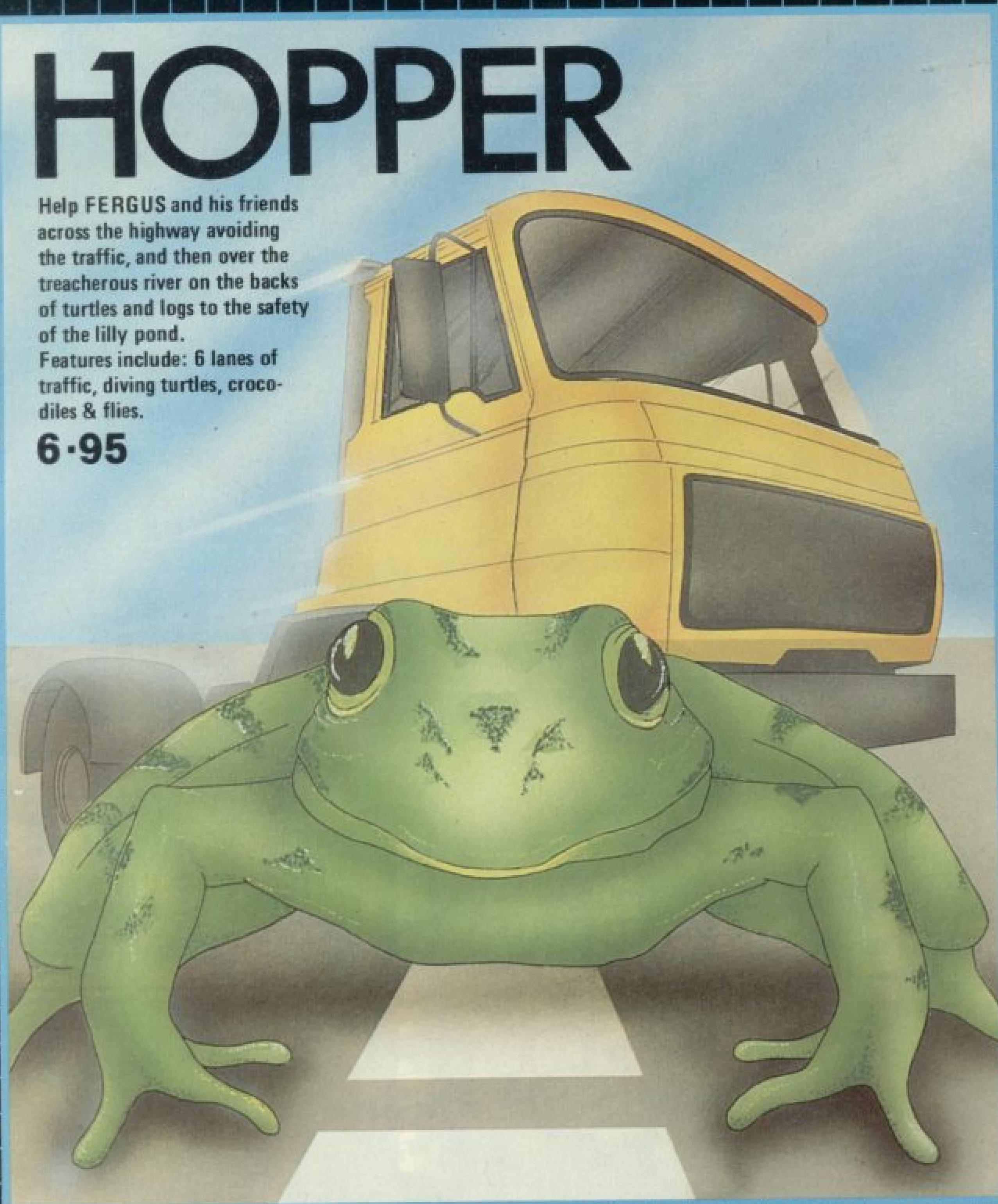
```
188  PRINT : PRINT "                    PRESS SPACE BAR TO START                  ": WAIT 49152,32
     : CALL  - 936: GOTO 199
189  GR : COLOR= C1
190  HLIN 0,39 AT 0: HLIN 0,39 AT 39: VLIN 1,39 AT 0: VLIN 1,39 AT 39
191  POKE 32,1: POKE 33,38
192  VTAB 21: PRINT "SCORE    => ";: PRINT  SPC( 26): PRINT  SPC( 40): PRINT
     "FUEL    => ";: PRINT  SPC( 28)
193  VTAB 21: HTAB 28: PRINT "STARDUST"
194 FL = 10000:LK = 5:TG = 5:TA = 0:X = 20:Y = 1:SC = 0:SA = 0
195  POKE 34,20: POKE 33,15: POKE 32,12: CALL  - 936
196  GOSUB 147: COLOR= C1: PLOT X,Y
197  POKE  - 16368,0: FLASH : PRINT : PRINT "  HIT ANY KEY ";: GET A$: NORMAL
     : CALL  - 936
198  GOTO 101
199  PRINT  SPC( 40): PRINT "                    I N S T R U C T I O N S               ";: PRINT
     SPC( 40): NORMAL
200  POKE 34,3
201  PRINT : PRINT " YOU ARE THE PILOT OF A SMALL SYLO SHIP NAVIGATING YOU
     R WAY THROUGH SPACE.  YOURMISSION IS TO COLLECT AS MUCH STAR-DUST AS
     YOU CAN. BY GUIDING YOUR SHIP OVER   EACH PIECE.": PRINT
202  PRINT " HOWEVER. BEWARE OF COLLIDING WITH ONE  OF THE MANY MOON-DUST
     FRAGMENTS.        THESE WILL PUNCTURE THE HULL OF YOUR    SHIP AND CA
     USE YOUR FUEL TO LEAK AWAY    FASTER WITH EACH COLLISION.": PRINT
203  PRINT " EVERY NOW AND THEN, A SPECIAL BASE WILLAPPEAR WHICH WILL SUPP
     LY YOU WITH MORE  FUEL AND ALSO AWARD YOU EXTRA POINTS, IF YOU HAVE G
     AINED AT LEAST 100 UNITS OF  STAR-DUST SINCE YOUR LAST DOCKING.": PRINT
204  GOSUB 212
205  PRINT : PRINT " THE MISSION BECOMES MORE DIFFICULT AS  YOU WEND YOUR
     WAY FURTHER, SO IF YOU ARETRAPPED AND COLLISION IS IMMINENT. THEN DON
     'T PANIC - YOU CAN ESCAPE INTO HYPER-SPACE."
206  PRINT "THIS DOES USE MORE FUEL HOWEVER. SO YOU MUST REMEMBER TO WATCH
     YOUR GAUGE. ALSO IT MUST BE STRESSED THAT YOU WILL REMAININ HYPER-SP
     ACE UNTIL YOU RETAKE COMMAND."
```

```
207  GOSUB 212
208  INVERSE : PRINT "OBJECT           COLOUR    VALUE          ": NORMAL : PRINT
     : PRINT "STAR-DUST      => PINK       10  UNITS": PRINT : PRINT "MOON-DU
     ST    => GREEN      1  FUEL UNIT": PRINT
209  PRINT "SERVICE BASE => BLUE       480 FUEL UNITS,
         480 UNITS"
210  INVERSE : PRINT "CONTROLS :": NORMAL : PRINT : PRINT "   UP   => 'Z'"
     : PRINT : PRINT "   DOWN => 'X'": PRINT : PRINT "   HYP  => 'ESC'": PRINT
     : PRINT "   STRT => 'SPACE'"
211  GOSUB 212: TEXT : CALL  - 936: INVERSE : GOTO 189
212  INVERSE : VTAB 23: PRINT "  PRESS SPACE BAR TO CONTINUE          "
213  POKE  - 16368,0
214  VTAB 23: HTAB 32: GET A$
215  IF  ASC (A$) <  > 32 THEN 214
216  NORMAL : CALL  - 936: RETURN
217  DATA   173,48,192,136,208,5,206,1,3,240,9,202,208,245,174,0,3,76,2,3,
     96,0,0
```


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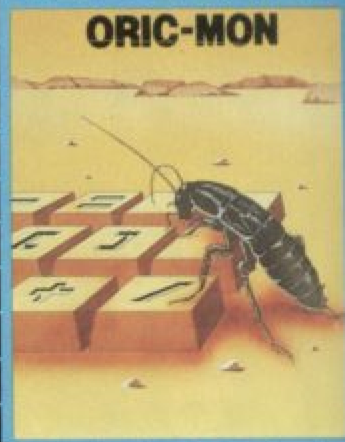
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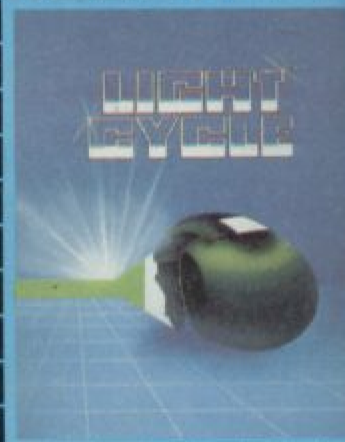


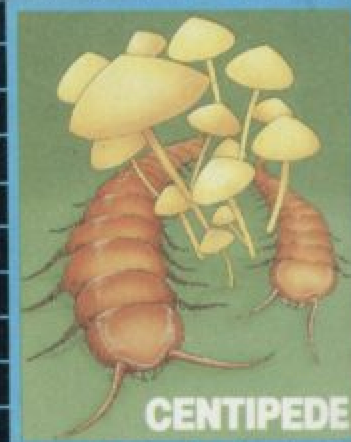
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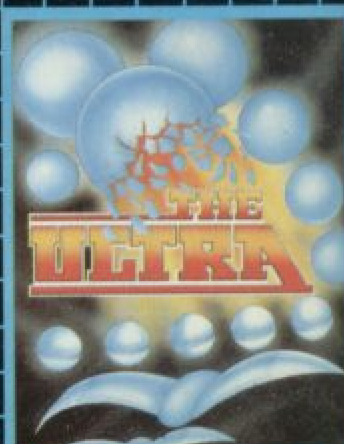
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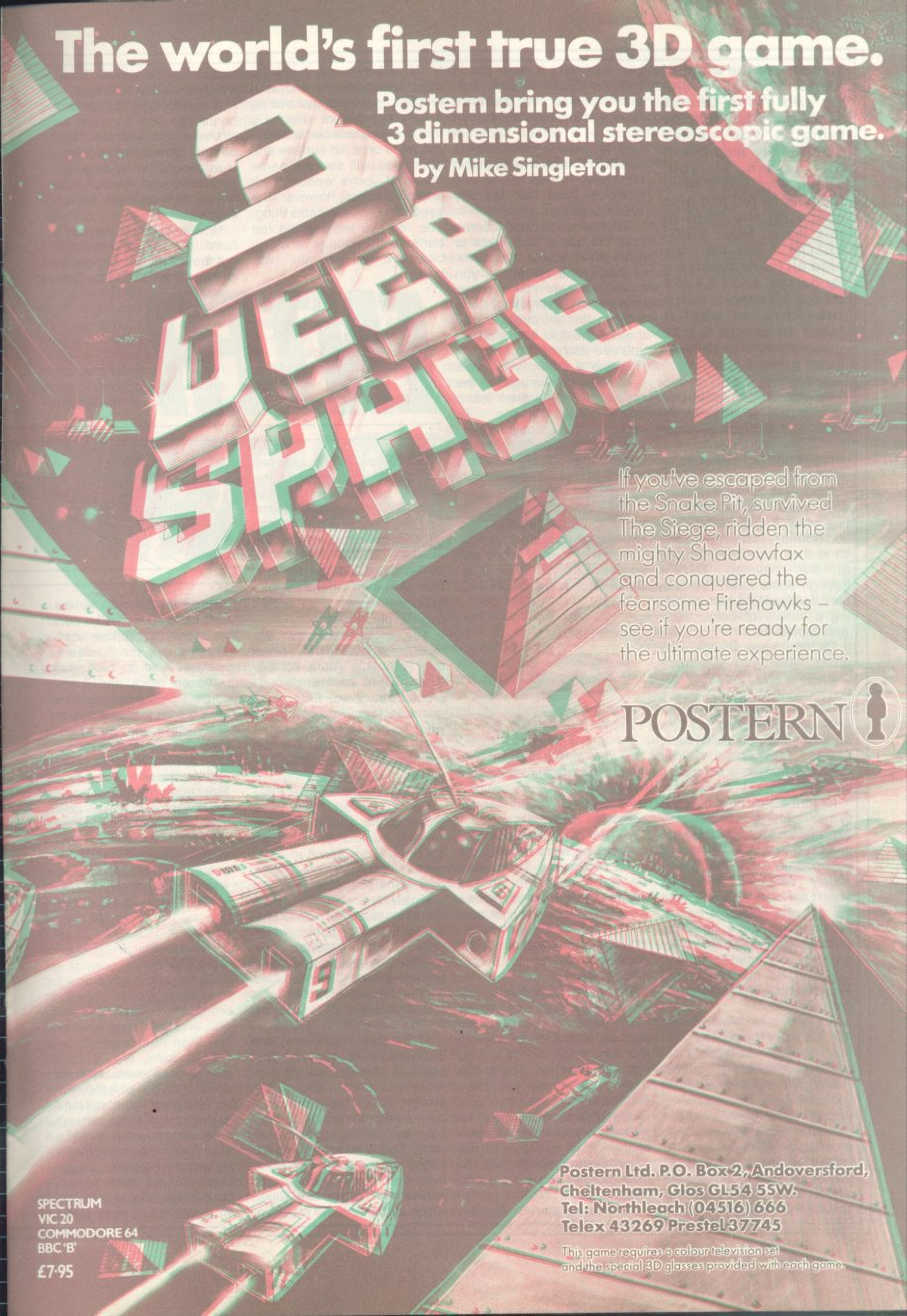
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ENTER NEW

Welcome to the wonderful world of 3D! *Computer and Video Games* scores another first by bringing you games that literally leap out of the screen at you! That's why you'll need the special red and blue specs on the front of this issue. MIKE SINGLETON is the man behind all these spectacular games, and he kicks off our 3D special with a run down on what it takes to create a true three-dimensional computer game . . .

I was enjoying a quiet drink or three with friends, mulling over the meaning of life, the universe and everything, when one of the twists and turns of conversation led to that hardy perennial, "Did you see?"

We found ourselves talking about the 3D film screened by ITV which caused a few million normally sane viewers to sit in their armchairs peering at the haunted fishtank through some funny red-and-blue spectacles whilst muttering a variety of oohs, aahs, and expletives.

Do you have friends who groan when you eventually manage to steer the conversation round to computers again, or do they just try to ignore you and hope you'll shut up? The reaction was bleak when I casually remarked, "You could do that on a computer' you know."

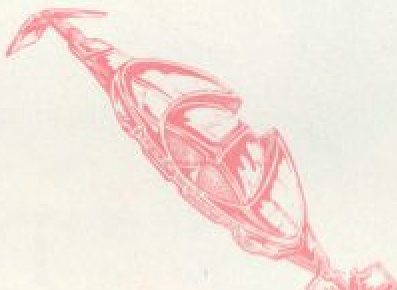
Nevertheless, I did manage to get a few words of waffly explanation in before the conversation was cunningly switched to something completely different. And that wasn't all! I was also promised the gift of a complete pair of red-and-blue specs, no doubt in the hope that I'd go away and play with them for a long, long time. So, there began my experiments with stereoscopic computer 3D.

But what *is* stereoscopic 3D? It's a pity the phrase "3D" has been so over-used in describing computer programs. Really the word should be "perspective" because the display you see in all these games is just a single image on a flat, very two-dimensional screen. It's no more true 3D than a painting but, because objects far away are portrayed smaller than objects close to. Like a painting it helps you to *imagine depth*. In fact, with simple perspective, you have no way of knowing whether an object of a certain apparent size is really a small object close to or really a large object far away. In the real world, however, you can literally *sense* depth.

Your sense of depth comes from the use of *both* eyes to focus on an object. At the risk of stating the obvious, if you have two eyes you see two images of everything, one through the left eye and one through the right. Like a drunk, you see double!

Unlike a drunk, your brain processes both images of the object and mixes them into a single, solid image. To achieve this single image effect, you superimpose the two pictures of the object as seen from the left and the right by crossing your eyes.

The closer the object is, the more you have to cross your eyes to see it as one image. The further away it is, the less you have to cross your eyes. Since your brain knows how



severely you are crossing your eyes, it quickly works out how far away the object is — you *sense* the distance!

Our sense of depth comes from seeing *two* images of the world around us. The picture we see through our left eye differs slightly from the picture we see through our right eye, and from these slight differences, the brain works out the depth of each object in our field of vision.

A simple experiment will show what I mean. Look at the room you are in and place yourself so that some objects are very much closer to you than others. Then look at the room through one eye only, first the left and then the right. Close objects will appear to shift angle and position as you change from one eye to the other. Distant objects will remain more or less in the same position.

To create a stereo effect on a TV screen — or, indeed, a magazine cover — the problem is to get each eye seeing a different picture. Normally this is impossible because the picture is on a flat surface and both eyes will see the same image. If you're wearing red-and-blue specs, however, the eyes *don't* see the same thing. The red eye will see the red parts of the picture and the blue eye will see the blue parts.

Both eyes, of course, will see the purple parts of the picture because purple has both blue and red in it. So, all we have to do to get the stereo effect is to superimpose two pictures on the screen, one drawn in red and one drawn in blue. Any part where the pictures overlap we draw in purple. Simple, isn't it?

Yes, *in principle*, but like most ideas, putting it into practice is a little more complicated. There are four sorts of problem involved. First of all come technical problems — what sort of computer is suitable? Then there are the mathematical problems involved in drawing perspective from two different viewpoints.

Having solved those, you arrive at the artistic question — yes, artistic, even though it's not a word found in most computer manuals — of composing the scenario.

Finally, there is the important brain-teaser of how to create a working game out of your previous labours. Of course, you don't solve these problems one by one because they all intermingle, but in the cause of clarity, let's imagine they're separate.

The technical problems ars the easiest to define. You need to display two distinct pictures on a single TV screen. To do this, your computer needs to be able to display four different colours at once. Purple, which is equally bright to both eyes. Red, which is bright to the red eye and dark to the blue eye. Blue, which is bright to the blue eye and dark to the red eye. Black, which is dark to both eyes.

In addition, the intensities of brightness and darkness for all these colours should ideally be the same. For example, blue should be as bright as purple through the blue lens but as dark as black through the red lens.

Now most colour computers have these colours available but the colour balance can be crucial. The BBC, the Commodore 64, the Vic-20 and the Atari all display fairly pure reds, blues and purples, which is ideal for 3D. The Spectrum, however, has a blue that verges on black and if you look through the red-and-blue specs at a blue square next to a red square, the red square shows up brighter through the *blue* lens than the blue square!

Spectrum owners should not despair, however, because I did eventually manage to find a special, tricky way of creating stereo 3D on that machine and the program for it is listed further on.



Some computers, such as the TI, the Oric and the Dragon, I have yet to test out but if you own one of these, why not do the experiment yourself?

The other technical factor involved is whether or not you can control the colour of individual pixels. If you can, you can create many more levels

DIMENSIONS

of depth because you can control more finely the separation of the red and blue images.

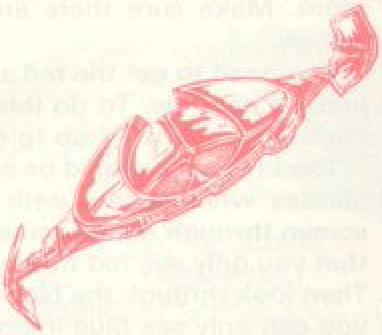
If, on the other hand, you can only program the colour of whole character cells, you are restricted to a few distinct levels of depth — two-cell separation, one-cell separation and no cell separation.

Of all the computers I've mentioned, the BBC is the easiest; programming the colour of individual pixels from Basic is almost child's play. It's also fairly easy on the Atari, which has a very flexible range of colours too, but the pixels are a bit chunkier. Even on the Commodore 64 and the Vic, it *is* possible but you have to use a very awkward multi-colour mode and to do this adequately in Basic the sort of game you could create would only be exciting to a tranquilised snail.

Having found out whether your chosen computer is suitable, you then face the "mathematical" problem of how to create 3D. Before we get down to the nitty-gritty, let's state categorically that the left eye is always red, the right eye is always blue and we're using a black background. There's no particular reason why the lenses shouldn't be the other way round but it's a convention that saves confusion.

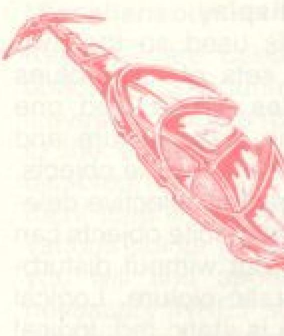
As I've already said, you need to create two pictures on the screen, in red and blue, but where do you *place* each of these? Some reference points are needed. Well, the best reference point is the level of the screen itself. An object at the level of the screen would appear in the same screen position through *both* eyes and therefore we would print the red image in the same place as the blue image, leaving a single image in purple. The left and the right eye would then, of course, see it in the same relative position.

What about an object in front of the screen? To see this as one image we would have to cross our eyes *more* and to make the eyes do this we have to print the red image



to the *right* of the blue image. Conversely, for an object behind the screen, we would have to cross our eyes *less* to see it as one image.

To enable this, we have to print the red image to the *left* of the blue image. In both these cases, the greater image separation, the further the object will appear in front of or behind the screen.



Things get a little more complicated when we try to decide on the precise amounts of separation. In Moonguard, the game I've programmed for the BBC computer, the ships appear on seven different levels but with the same apparent distance between each level so that there are ships at 100 yards, 200 yards, 300 yards and so on, with a constant difference of 100 yards between each level. It only looks inches in miniature, but on a big enough TV set.

You might imagine there's a likewise constant difference between the separations. Not so! Instead, there's a constant *ratio* between image separations so that we get a geometric series of separations. An example, of such a series is 1, 2, 4, 8, 16, 32 etc. The constant ratio is two — each number is two times the previous one.

In a computer display using this ratio you would quickly run out of screen, so in Moonguard the ratio used is 5/4. Mathematically, if you're using x, y and z co-ordinates where z is the depth, then the image separation is proportional to 1/z. For extra speed in Basic, however, it's more convenient to keep to a limited number of levels, pre-calculate the separation and store the results in an array, rather than use a formula each time you need to print. So, the sort of statement you would need to set up such an array of separations would be:–

$S(L) = S(L-1)*1.25$ where L is the level.

Finally, one more adjustment needs to be made so that some levels appear behind the screen and some in front. To do this, we simply subtract a constant from each level's separation number.

In Moonguard, this constant is equal to the separation number of level five so that level five has a final separation of zero — in other words, it appears as a single purple image at the level of the screen.

Levels below five have a negative final separation (red to the left of blue, object behind the screen) and levels above five have a positive separation (red to the right of blue, object in front of the screen). The complete statement for final separation of a given level is therefore:

$FS(L) = S(L) — S(5)$

To create the drawings in perspective, a similar relationship holds between the sizes on the screen of identical objects at different levels:

$SIZE(L) = SIZE(L-1)*1.25$

If, as in Moonguard, you're using x and y co-ordinates for drawing images, all you need to do to get images of the correct size in the correct perspective positions is to multiply their "real" x and y coordinates by the relevant size factor. This will give you their screen x and y co-ordinates.

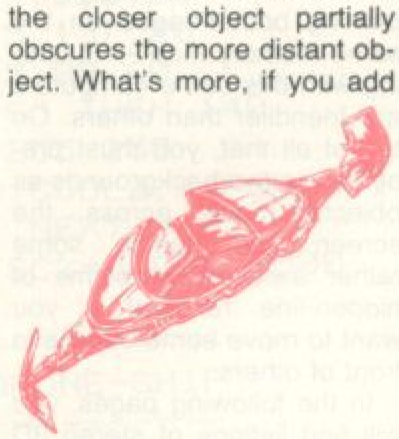
Then, to print in red, you ADD the separation for that level; to print in blue, you SUBTRACT the separation for that level. Readers should note that on the BBC you can shift the screen x, y origin to the centre of the screen, a technique used in Moonguard. If you can't do this on your own computer, you will have to make further x and y adjustments to mimic this.

Phew! Thank goodness we've got the maths out of the way! Artistic considerations next. Early on in my experiments, I quickly realised that there was more to the stereo effect than simply getting the maths right. Some attempts I made were definitely more striking than others, so the missing factor had to be picture composition.

With incredible dedication to my researches, I even forced myself to see Friday the 13th Part III — in full stereoscopic vision — it was an atrocious film but the 3D was stunning!

Eventually, two principles became clear. Firstly, the eyes perceive depth better when given the opportunity for comparison. This means that objects at different depths should be placed closed to teach other on the screen so that the eye is forced to compare their depths.

The effect is even better if the closer object partially obscures the more distant object. What's more, if you add



to the whole picture a really distant background, that makes everything else stand out dramatically because the eyes are constantly aware of those distant, far-off images behind all the others.

Secondly, the eyes get bored! If the scene portrayed is just too simple, your brain isn't really bothered about per-

ceiving depth — it seems to reckon that it's not worth the effort. You have to provide something worth looking at, something with enough detail to get the eyeballs spinning.

At the same time, you have to provide *recognisable* features otherwise the scene simply becomes too confusing.

In Moonguard I used the familiar device of craters as the distant background and fairly simple geometric shapes for the ships in the foreground — enough detail but not too much. Using geometric shapes in the foreground also made it not too difficult to do hidden-line removal when I wanted one ship to partially obscure another. One of the extra difficulties of stereo 3D is that a RED line is **not** hidden by a BLUE object, only by a RED object.

Lastly, there's the task of creating a worthwhile game out of all this. In theory, having an extra dimension to play with should open up endless possibilities. Those of you who manage to achieve stereo on your own computers will see straight away all that apparent extra *space* — the screen seems to physically grow!

The real drawback, as far as games are concerned, is speed. Flat games only have to shift one image to create movement. In stereo games you need to shift two images to create the same movement. That, at the very least, doubles the time involved.

Yet more complications arise from the fact that you're printing both images on the same memory map — in coping with this some computers are friendlier than others. On top of all that, you must preserve the *two* backgrounds as objects move across the screen and handle some rather awkward problems of hidden-line removal if you want to move some objects in front of others.

In the following pages, you will find listings of stereo 3D games for five popular computers — the BBC B, Spectrum, Atari, Commodore 64 and Vic 20. I've programmed each of these games with two things in mind — first, to provide an enjoyable game with a genuine stereo effect and second, to give some useful tips on how to go about programming your own stereo games.

The approach has to differ for each particular make of computer since they all have their own peculiarities. Moonguard, which is the feature game, uses one or two handy tricks that are really only appropriate to the BBC.

Each pixel (in screen mode two) has four bits ascribed to it which can define up to 16 programmable colours. The static part of the screen is drawn using two of these bits only (one for red and one for blue — purple when both are set).

The mobile ships and lasers are drawn using the other two bits of each pixel (again programmed for red, blue and purple). So, when the mobile objects are deleted and reprinted elsewhere, the background is automatically preserved.

Even so, movement is slow in Basic, so only one enemy ship moves at a time, progressing up the screen at one of seven possible levels of depth. Instead of manoeuvring your ships, you simply choose one of them to fire at the enemy but you have to be careful to choose the one at the correct depth and you have to time your firing accurately.

It's a compromise, but one that works very effectively and it certainly tests your perception of depth.

The programs for the other four computers take a different approach to the speed problem. They use character cell separation rather than pixel separation of images and most of the movement is at the level of the screen. If you remember, this means moving only one image instead of two, a much quicker proposition.

All of the games are designed to give an idea of what's possible with stereo 3D even in Basic and I hope most of you will be able to use the same principles to create your own stereo games.

But, if the thought of all that programming makes you groan, have no fear; I've also been busy on full machine-code stereo games for all of these computers, most of which will be available commercially by the time you read this (thinks — will the editor allow this blatant plug?). The stereoscopic world of computer games is already with us! Have fun!

TV INSTRUCTIONS

To get the best effects from your 3D listing follow these simple rules.

The stereoscopic effect comes over best in a shady room. Make sure there are no reflections on your TV screen.

You need to get the red and blue colours on your TV as pure as possible. To do this turn the colour and contrast controls on your TV up to maximum.

The brilliance should be adjusted while wearing the 3D glasses which come with this magazine. Look at the screen through one eye at a time. Adjust the brilliance so that you only see red through the red lens of the glasses. Then look through the blue lens and adjust the control so you can only see blue images.

If it is not possible to do this perfectly, make the second colour you see through each lens as faint as possible. For example, if you are still seeing some red through the blue lens try to make the red as dim as possible by using the brilliance control.

The best viewing distance varies with the size of your TV screen. But somewhere between four and eight feet should be ideal. You should sit directly in front of the screen to enjoy the best effect. When you first put the 3D glasses on it may take your eyes a minute or two to adjust, but after a while the two red and blue images will merge into a single stereoscopic image.

Move your head from side to side while looking at the screen to convince yourself that you are looking at a true 3D game. Objects in the foreground will appear static, but the position of objects in the background will apparently change!

By following these simple rules you'll get the best out of these games. But remember, please ask your parents before you start fiddling with the TV, they might not want to see Coronation Street in unnatural colours!

PROGRAM NOTES

Screen display

Mode 2 is used so that two separate sets of reds, blues and purples can be used, one set for the static picture and one set for the mobile objects.

This enables selective deletion so that mobile objects can be wiped out without disturbing the static picture. Logical colour (1) is static red, logical colour (2) is static blue, logical colour (4) is mobile red and logical colour (8) is mobile blue.

From this scheme, all the other logical colours definitions follow. For example, logical colour (3) (1 ORed with 2) is purple and so is logical colour 12 (4 ORed with 8).

When drawing a line, the GCOL statement is used to OR the colour the line is being drawn in with the existing colour on the screen at that point. This means that red drawn on blue will appear as purple.

When deleting a line, the GCOL statement is used to AND what's on the screen with the *opposite* colour of the line to be deleted. For example, to delete a line in blue, we draw a fresh line that ANDs red with what's on the screen. This preserves any red that's already there but deletes the blue. The full scheme of logical colours can be seen in lines 2460-2610.

Also, to simplify calculations, the screen origin is shifted to the centre of the screen (see line 2450).

Obscured objects

The first rule in composing the picture is that objects further away are drawn first. Then, as the guardships are drawn, selective deletion of what's already on the screen in that position occurs.

The selective deletion is done for each ship by using PLOT 81, x, y which fills a triangle with a colour specified by GCOL.

The GCOL statement is an AND with red or blue as appropriate. If we're going to draw a red ship, we AND with blue and vica-versa.

Speed of operation

To enable the game to run at the maximum possible speed,



MOON GUARD

THE FIRST 3D COMPUTER GAMES

the title page and the set-up of the screen display have been perversely put at the end of the program. This is so the action parts of the program can come nearer to the beginning of the listing. Any loops and GOTO's will then execute slightly faster.

Reverse field

When a hit on the enemy is scored, the whole screen reverses colour. The bright parts become dark and the dark parts become bright. This can be done very rapidly by just changing the actual colours ascribed to the logical colours.

A complete reversal is needed, however. Not only does purple become black and black become purple but red becomes blue and blue becomes red. This is the only way to preserve the stereo depth.

Against a black background, blue images will show up when seen through a blue lens but against a purple background *red* images will show up through a blue lens.

Miscellaneous

Keys 1-7 are used as firing buttons. Unfortunately, this leaves the fingers rather close to the escape key so this is disabled using an *FX statement (see line 2440). Also, at various points in the program you will find apparently unnecessary INKEY statements. The purpose of these is simply to get rid of what's in the keyboard buffer so that your lasers don't fire more times than you intend them to.

Variables & Arrays

S(7): size of object at given level. Also used to calculate image separation
S$(7): character string of emeny ship according to level.
D%(7, 8): image separation at any given level. First parameter is the level, second parameter is the logical colour. This array is only used for moving ships so the only logical colours used are (4) and (8).
X%(7), Y%(7): the X and Y co-ordinates which define the starting positions of the laser beams at each level.

```
   10 GOTO 2000
   97 REM ---------------
   98 REM START OF GAME
   99 REM ---------------
  100 MOVE 0,300:GCOL1,12:PRINT"S TO START"
  110 SOUND 3,-15,185,20
  120 SOUND 3,-15,137,20
  130 SOUND 3,-15,89,60
  140 IF GET$<>"S" THEN 140
  150 SOUND 2,2,255,255
  160 MOVE 0,300:GCOL2,3:FOR K=1 TO 10:PRINT D$;:NEXT
  170 GOSUB 950:SC%=0:GOSUB900
  180 TIME=0
  197 REM ---------------
  198 REM MOVE DRONE-SHIP
  199 REM ---------------
  200 SL%=RND(7):SX%=RND(300)+200:SY%=-600
  210 IF TIME>T THEN SOUND &12,0,0,1:GOTO 100
  220 SY%=SY%+8:PROCSHIP(SX%,SY%,SL%):IF SY%>600 THEN 200
  230 I$=INKEY$(0):IF I$<"1" OR I$>"7" THEN 220
  297 REM ------------------------
```

```
  298 REM LASER FIRING & DRONE M
OVING
  299 REM ----------------------
-----
  300 SOUND &11,1,255,255:SOUND
&10,-15,7,50
  310 LL%=8-VAL(I$):LX%=0:UY%=Y%
(LL%)+4*LL%:LY%=Y%(LL%)-12
  320 LX%=LX%+X%(LL%):SY%=SY%+12
:IF LX%>700 THEN PROCBEAMOFF(LL%
):GOTO 220
  330 PROCLASER(LX%,LL%):PROCSHI
P(SX%,SY%,SL%):I$=INKEY$(0)
  340 IF LL%<>SL% OR SY%>UY% OR
SY%<LY% OR SX%>LX% THEN 320
  397 REM ----------------------
--
  398 REM DRONE-SHIP HIT & EFFEC
TS
  399 REM ----------------------
--
  400 PROCHIT(SX%,SY%,SL%):PROCB
EAMOFF(LL%):SC%=SC%+10*(8-LL%):G
OSUB 900
  410 FOR K=1 TO 10
  420 SOUND &11,1,255,255:SOUND
&10,-15,7,50
  430 VDU19,0,5,0,0,0:VDU19,3,0,
0,0,0:VDU19,1,4,0,0,0:VDU19,2,1,
0,0,0
  440 FOR J=1 TO 200:NEXT
  450 VDU19,0,0,0,0,0:VDU19,3,5,
0,0,0:VDU19,1,1,0,0,0:VDU19,2,4,
0,0,0
  460 FOR J=1 TO 100:NEXT
  470 NEXT
  480 FOR K=1 TO 10:I$=INKEY$(0)
:NEXT
  490 GOTO 200
  497 REM -----------
  498 REM DRAW CRATER
  499 REM -----------
  500 DEF PROCCRATER(X,Y,R)
  510 LOCAL A,N
  520 FOR A=0 TO PI STEP PI/R
  525 GCOL1,1:PLOT 4,1*120+X+R*1
.2*SIN(A),Y+R*COS(A):  PLOT 5,1*1
20+X+R*.7*SIN(A),Y+R*COS(A)
  530 GCOL1,2:PLOT 4,2*120+X+R*1
.2*SIN(A),Y+R*COS(A):  PLOT 5,2*1
20+X+R*.7*SIN(A),Y+R*COS(A)
  540 NEXT A
  550 FOR A=PI TO 2*PI STEP PI/R
  560 GCOL1,1:PLOT 69,1*120+X+R*
1.2*SIN(A),Y+R*COS(A)
  565 GCOL1,2:PLOT 69,2*120+X+R*
1.2*SIN(A),Y+R*COS(A):NEXT A
  570 FOR A=0 TO 2*PI-PI/18 STEP
 PI/15:N=1.2+.7*RND(1)
  575 GCOL1,1:PLOT 4,1*120+X+R*1
.56*SIN(A),Y+R*1.3*COS(A):PLOT 5
,1*120+X+R*1.56*N*SIN(A),Y+R*1.3
*N*COS(A)
  580 GCOL1,2:PLOT 4,2*120+X+R*1
.56*SIN(A),Y+R*1.3*COS(A):PLOT 5
,2*120+X+R*1.56*N*SIN(A),Y+R*1.3
*N*COS(A)
  585 NEXT A
  590 ENDPROC
  597 REM ----------------
  598 REM PRINT DRONE-SHIP
  599 REM ----------------
  600 DEF PROCSHIP(X%,Y%,L%)
  605 LOCAL C%
  610 FOR C%=4 TO 8 STEP 4
  615 MOVE X%+D%(L%,C%),Y%:GCOL1
,C%:PRINT S$(L%)
  620 MOVE X%+D%(L%,C%),Y%-Z%(L%
):GCOL2,3:PRINT D$
  625 NEXT
  630 ENDPROC
  647 REM ------------------
  648 REM WIPE OUT DRONE-SHIP
  649 REM ------------------
  650 DEF PROCHIT(X%,Y%,L%)
  655 LOCAL C%
  660 FOR C%=4 TO 8 STEP 4
  665 MOVE X%+D%(L%,C%),Y%:GCOL2
,3:PRINT D$
  670 NEXT
  680 ENDPROC
  697 REM ---------------
  698 REM DRAW LASER BEAM
  699 REM ---------------
  700 DEF PROCLASER(X%,L%)
  705 LOCAL C%
  710 FOR C%=4 TO 8 STEP 4
  715 GCOL1,C%
  720 PLOT 4,D%(L%,C%),Y%(L%):PL
OT 1,X%,0
  725 NEXT
  730 ENDPROC
  747 REM -----------------
  748 REM DELETE LASER BEAM
  749 REM -----------------
  750 DEF PROCBEAMOFF(L%)
  755 GCOL2,3
  760 PLOT 4,0,Y%(L%):PLOT 1,640
,0
  770 ENDPROC
  797 REM ---------------
  798 REM DRAW GUARDSHIP
  799 REM ---------------
  800 DEF PROCGUARD(X,Y,S)
  805 LOCAL C,D,E:FOR D=-1 TO 1
STEP 2:C=1.5+D/2:E=1.5-D/2
  810 GCOL1,C
  820 PLOT 4,X-D*(S-3)*20,Y
```

```
 821 PLOT 1,96*S,24*S
 822 PLOT 81,-96*S,8*S
 823 PLOT 1,0,-24*S
 824 PLOT 81,-24*S,0
 825 PLOT 1,0,32*S
 826 PLOT 81,32*S,0
 830 GCOL2,E
 840 PLOT 1,-32*S,0
 841 PLOT 81,16*S,16*S
 842 PLOT 1,32*S,0
 843 PLOT 81,-16*S,-16*S
 844 PLOT 1,-8*S,-8*S
```



```
 845 PLOT 1,96*S,-8*S
 846 PLOT 81,-64*S,40*S
 850 GCOL1,C
 860 PLOT 1,64*S,-40*S
 861 PLOT 0,-64*S,40*S
 862 PLOT 1,-32*S,-32*S
 863 PLOT 0,8*S,8*S
 864 PLOT 1,-32*S,0
 865 PLOT 1,16*S,16*S
 866 PLOT 1,32*S,0
 880 NEXT
 890 ENDPROC
 897 REM ----------
 898 REM PRINT SCORE
 899 REM ----------
 900 MOVE -640,132:GCOL2,0:PRIN
T B$
 910 MOVE -640,132:GCOL0,3:PRIN
T;SC%
 920 RETURN
 947 REM ---------------
 948 REM PRINT HIGH SCORE
 949 REM ---------------
 950 IF HI%>SC% THEN RETURN
 955 IF HI%>SC% THEN RETURN
 960 HI%=SC%
 965 MOVE -640,-420:GCOL2,0:PRI
NT B$
 970 MOVE -640,-420:GCOL0,3:PRI
NT;HI%
 980 RETURN
 997 REM --------------
 998 REM CHARACTER DATA
 999 REM --------------
1000 DATA 24,24,0,0,0,0,0,0
1001 DATA 24,24,60,0,0,0,0,0
1002 DATA 24,24,60,60,0,0,0,0
1003 DATA 24,24,60,60,126,0,0,0
1004 DATA 24,24,60,60,126,126,0
,0
1005 DATA 24,24,60,60,126,126,2
55,0
1006 DATA 24,24,60,60,126,126,2
55,255
1997 REM ---------
1998 REM TITLE PAGE
1999 REM ---------
2000 MODE7
2010 PRINT TAB(9,1);CHR$(141);C
HR$(131);"M O O N G U A R D"
2020 PRINT TAB(9,2);CHR$(141);C
HR$(131);"M O O N G U A R D"
2025 PRINT TAB(4,4);CHR$(133);"
by Mike Singleton for C & VG"
2030 PRINT TAB(0,6);CHR$(130);"
  You are Commander of the Moong
uard,"
```

```
 2040 PRINT CHR$(130);"a squadro
n of seven starcruisers whose"
 2050 PRINT CHR$(130);"task is t
o protect the surface of the"
 2060 PRINT CHR$(130);"Moon from
 attack by the small but"
 2070 PRINT CHR$(130);"lethal Vo
rgoth drone-ships."
 2080 PRINT CHR$(130);" Your cr
uisers are at seven orbital"
 2090 PRINT CHR$(130);"levels an
d so are the enemy ships. You"
 2100 PRINT CHR$(130);"must fire
 at the correct level to hit"
 2110 PRINT CHR$(130);"a drone.
The deeper the level, the "
 2120 PRINT CHR$(130);"more poin
ts you get. Keys 1-7 are for"
 2130 PRINT CHR$(130);"firing, k
ey S is to start."
 2140 PRINT
 2150 PRINT CHR$(129);"PLEASE EN
TER THE NUMBER OF MINUTES YOU"
 2160 PRINT CHR$(129);"WANT EACH
 MISSION TO LAST."
 2170 PRINT:PRINT CHR$(135);:INP
UT "MISSION TIME " T
 2180 T=T*60*100
 2197 REM ----------------------
 2198 REM SET VARIABLES & DEFINE
 CHARS
 2199 REM ----------------------
------
 2200 DIM S(7):S(5)=3:S(6)=4:S(7
)=4*4/3
 2210 S(4)=3*3/4:S(3)=S(4)*3/4:S
(2)=S(3)*3/4:S(1)=S(2)*3/4
 2230 VDU 23,240,255,255,255,255
,255,255,255,255
 2240 DIM S$(7):DIM B%(8)
 2250 FOR C=241 TO 247
 2260 FOR K=1 TO 8:READ B%(K):NE
XT
 2270 VDU 23,C,B%(1),B%(2),B%(3)
,B%(4),B%(5),B%(6),B%(7),B%(8)
 2280 S$(C-240)=CHR$(C)
 2290 NEXT
 2300 B$=CHR$(240)+CHR$(240)+CHR
$(240)+CHR$(240)+CHR$(240)
 2310 S$=CHR$(241):D$=CHR$(240)
 2320 DIM Z%(7):FORK=1TO7:Z%(K)=
4+K*4:NEXT
 2330 DIM D%(7,8):FOR K=1 TO 7:D
%(K,4)=INT((S(K)-3)*20):D%(K,8)=
-D%(K,4):NEXT
 2340 DIM Y%(7):FORK=1 TO 7:Y%(K
)=500-S(K)*136:NEXT
 2350 DIM X%(7):FOR K=1 TO 7:X%(
K)=INT(32*S(K)):NEXT
 2360 SC%=0:HI%=0
 2397 REM ----------------------
-
 2398 REM DEFINE COLOURS & SOUND
S
 2399 REM ----------------------
-
 2400 MODE 2
 2410 ENVELOPE 1,1,-1,-1,-1,100,
100,100,0,0,0,0,0,0
 2420 ENVELOPE2,1,-52,-52,-52,25
5,255,255,57,0,0,-57,56,0
 2430 ENVELOPE3,4,0,0,0,1,1,1,12
7,-1,0,0,126,0
 2440 *FX229,1
 2450 VDU 29,640;512;
 2460 VDU19,0,0,0,0,0
 2470 VDU19,1,1,0,0,0
 2480 VDU19,2,4,0,0,0
 2490 VDU19,3,5,0,0,0
 2500 VDU19,4,1,0,0,0
 2510 VDU19,5,1,0,0,0
 2520 VDU19,6,5,0,0,0
 2530 VDU19,7,5,0,0,0
 2540 VDU19,8,4,0,0,0
 2550 VDU19,9,5,0,0,0
 2560 VDU19,10,4,0,0,0
 2570 VDU19,11,5,0,0,0
 2580 VDU19,12,5,0,0,0
 2590 VDU19,13,5,0,0,0
 2600 VDU19,14,5,0,0,0
 2610 VDU19,15,5,0,0,0
 2697 REM -------------
 2698 REM DRAW MOONSCAPE
 2699 REM -------------
 2700 COLOUR3:PRINT TAB(5,31);"M
OONGUARD";
 2710 VDU 5:REM TEXT AT GRAPHICS
 CURSOR
 2720 PROCCRATER(0,0,50)
 2730 PROCCRATER(250,-80,70)
 2740 PROCCRATER(-400,-200,30)
 2750 PROCCRATER(300,200,40)
 2760 PROCCRATER(250,-300,40)
 2770 PROCCRATER(-100,400,40)
 2780 PROCCRATER(-500,300,60)
 2790 PROCCRATER(-320,50,30)
 2800 PROCCRATER(-600,-100,50)
 2810 PROCCRATER(100,-400,40)
 2820 PROCCRATER(-120,-320,50)
 2830 FOR Z=1 TO 7
 2840 PROCGUARD(-80*S(Z),500-160
*S(Z),S(Z))
 2850 NEXT
 2860 GOTO 100
```

The stereo effect is coaxed out of the Spectrum by using magenta, green and yellow instead of red, blue and purple. The red-and-blue spectacles still work with these colours.

For reasons of speed, the action of Manhattan Invasion takes place in the foreground only. It is, of course, possible to have action in the background as well – the D-Deep machine code game I've been working on for the Spectrum (see Games News) has swift, smooth movement at all depths – but in Basic this tends to slow the game down unbearably!

In the far distance is a background of skyscrapers separated by dark strips of sky. In the middle ground is a chequered wall. In the foreground there are the enemy invaders plus your own missile base at the bottom of the screen.

The idea of the game is to knock out the enemy invaders but if you hit one, it doesn't explode – it is just immbolised. None of your missiles can pass through an immobile invader so it acts as a shield for any invaders coming in above it. The invaders attack from left to right and you only score a hit if you prevent them from reaching the right-hand edge of the screen.

In each sheet there are eight invaders, all flying at different heights. The higher the invader, the higher you score if you hit it. One game consists of three screens, but if you manage to immobilise a whole screen of invaders, you get a chance at an extra screen.



MANHATTAN INVASION

RUNS ON A SPECTRUM IN 16K AND 48K

Variables	
bx, by	: missile base x,y coordinates
mx, my	: missile x,y coordinates
ex,ey	: enemy ship coordinates
sheet	: sheet counter
hit	: hit counter
c	: number of ships on current sheet
score	: current score
high	: current high score
1(17)	: flags for recording which heights have already been used

Controls
Key 5: move base left
Key 8: move base right
Key 7: fire missile
Key S: start new game

NOTE: In lines 10-100 and lines 800-840 the capital letters in strings refer to GRAPHICS characters whose user definitions are given in lines 500-617.

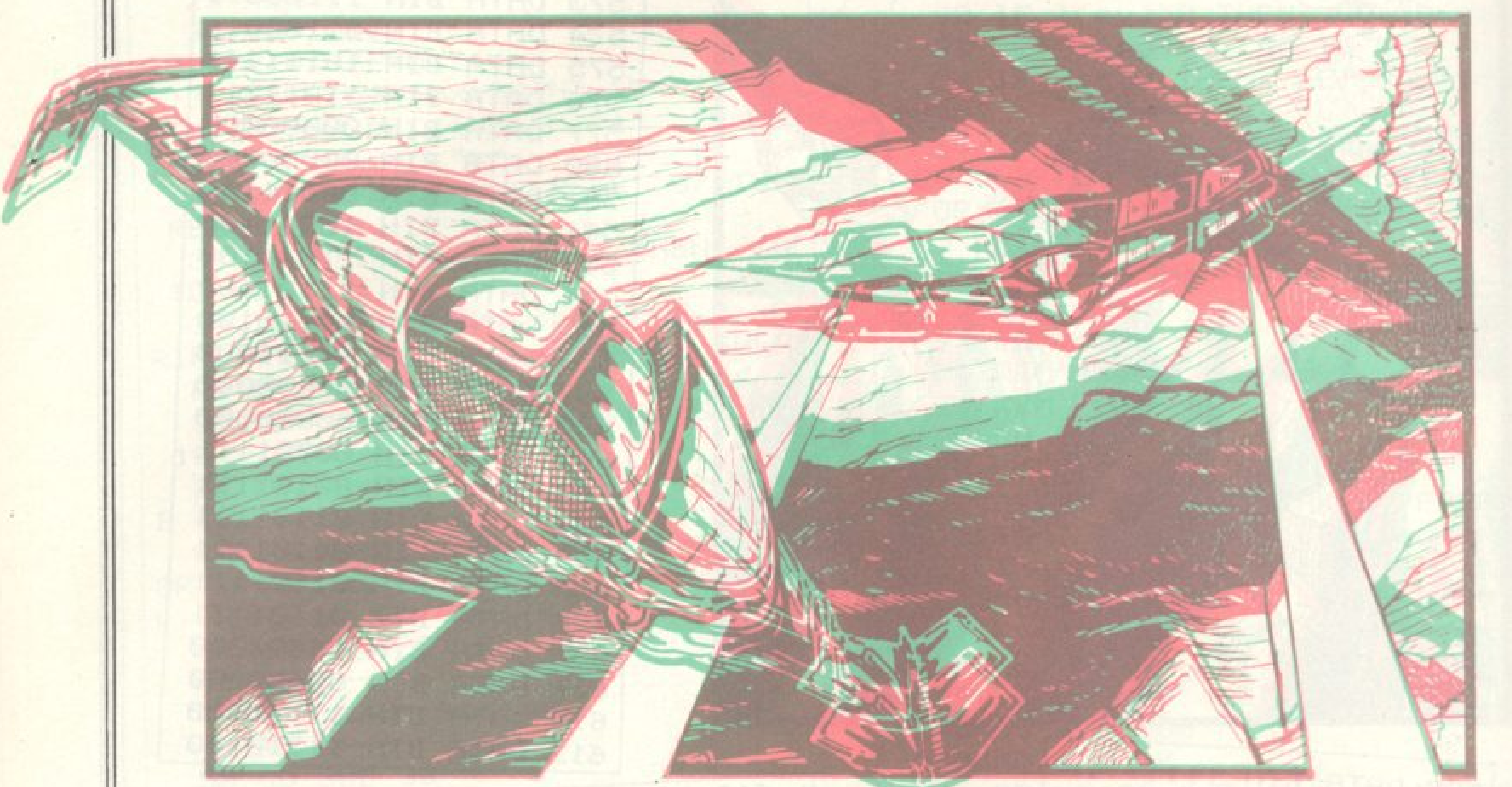
```
  1 GO TO 100
  7 REM ---------------------
  8 REM restore background
  9 REM ---------------------
 10 GO TO 11+x-8*INT (x/8)
 11 PRINT  INK 3;AT y,x;"b";: R
ETURN
 12 PRINT  INK 3;AT y,x;"c";: R
ETURN
 13 PRINT  INK 6;AT y,x;"b";: R
ETURN
 14 PRINT  INK 6;AT y,x;"c";: R
ETURN
 15 PRINT  INK 6;AT y,x;"b";: R
ETURN
 16 PRINT  INK 6;AT y,x;"c";: R
ETURN.
 17 PRINT  INK 4;AT y,x;"b";: R
ETURN
 18 PRINT  INK 4;AT y,x;"c";: R
ETURN
 27 REM ------------
 28 REM print ships
```

```
  29 REM -----------
  30 LET y=ey: LET x=ex: GO SUB
10: PRINT "fghi"
  31 LET xc=3+bx-2*INT (bx/2): P
RINT AT by,bx; INK xc;"a"; INK 7
;"jdk"; INK xc;"a"
  32 IF my=20 THEN  BEEP .07,10:
 RETURN
  33 IF ATTR (my,mx)=71 THEN  GO
 TO 36
  34 IF my>1 THEN  BEEP .02,5: P
RINT AT my,mx;"e": IF my=19 THEN
  RETURN
  35 LET y=my+2: LET x=mx: GO TO
 10
  36 LET y=my+2: LET x=mx: GO SU
B 10
  37 IF my=ey THEN  LET ex=27: F
OR k=50 TO 10 STEP -1: BEEP .02,
k: NEXT k: GO SUB 70
  38 LET my=20: RETURN
  47 REM -----------
  48 REM game action
  49 REM -----------
  50 GO SUB 30
  51 LET ex=ex+1: IF ex>27 THEN
 LET ex=0: LET c=c+1: GO TO 90
  52 LET i$=INKEY$
  53 IF i$="5" AND bx>0 THEN  LE
T bx=bx-1
  54 IF i$="8" AND bx<27 THEN  L
ET bx=bx+1
  55 IF my<20 THEN  LET my=my-2:
 IF my=-1 THEN  LET my=20
  56 IF i$="7" AND my=20 THEN  L
ET my=19: LET mx=bx+2
  57 GO TO 50
  67 REM -------------
  68 REM add to score
  69 REM -------------
  70 LET hit=hit+1: LET count=c+
1: LET score=score+(19-my)*5: LE
T s$=STR$ score
  71 PRINT AT 0,4-LEN s$; INK 0;
 BRIGHT 0; PAPER 7;s$
  72 RETURN
  77 REM -----------------
  78 REM update high score
  79 REM -----------------
  80 IF score<=high THEN RETURN

  81 LET high=score: LET h$=STR$
 high
  82 PRINT AT 0,32-LEN s$; INK 0
; BRIGHT 0; PAPER 7;s$
  83 RETURN
  87 REM ----------------------
  88 REM new ship/end of sheet
  89 REM ----------------------
  90 IF c=8 THEN  GO TO 94
  91 LET ey=3+2*INT (RND*8)
  92 IF l(ey)>0 THEN  GO TO 91
  93 LET l(ey)=1: GO TO 52
  94 IF hit<8 THEN  LET sheet=sh
eet-1
  95 IF sheet>0 THEN  BEEP .5,5:
 GO SUB 800: LET hit=0: LET c=0:
 FOR k=1 TO 17: LET l(k)=0: NEXT
 k: LET bx=15: GO TO 90
  96 BEEP .5,10: BEEP .5,5: GO S
UB 80: RETURN
  97 REM ---------
  98 REM start up
  99 REM --------
 100 GO SUB 850
 110 LET high=0: LET by=21
 120 PRINT AT 0,0; INK 0; PAPER
7; BRIGHT 0;"0000": LET score=0:
 LET sheet=3: LET hit=0: LET c=0
 125 FOR k=1 TO 17: LET l(k)=0:
NEXT k
 130 LET ex=0: LET bx=15
 135 LET my=20: LET mx=bx
 140 GO SUB 800
 150 GO SUB 90
 151 PRINT AT 4,5; INK 0; PAPER
7;"     "
 152 PRINT AT 5,5; INK 0; PAPER
7;" END "
 153 PRINT AT 6,5; INK 0; PAPER
7;"     "
 160 IF INKEY$<>"s" THEN  GO TO
160
 170 GO TO 120
 497 REM --------------
 498 REM character data
 499 REM --------------
 500 DATA BIN 00000000
 501 DATA BIN 01111110
 502 DATA BIN 01111110
 503 DATA BIN 01111110
 504 DATA BIN 01111110
 505 DATA BIN 01111110
 506 DATA BIN 01111110
 507 DATA BIN 00000000
 510 DATA BIN 01111111
 511 DATA BIN 01111111
 512 DATA BIN 01111111
 513 DATA BIN 01111111
 514 DATA BIN 01111111
 515 DATA BIN 01111111
 516 DATA BIN 01111111
 517 DATA BIN 01111111
 520 DATA BIN 11111110
 521 DATA BIN 11111110
 522 DATA BIN 11111110
 523 DATA BIN 11111110
 524 DATA BIN 11111110
 525 DATA BIN 11111110
 526 DATA BIN 11111110
```



```
527 DATA BIN 11111110
530 DATA BIN 00000000
531 DATA BIN 00011000
532 DATA BIN 11011011
533 DATA BIN 11011011
534 DATA BIN 10111101
535 DATA BIN 01111110
536 DATA BIN 01111110
537 DATA BIN 00000000
540 DATA BIN 00000000
541 DATA BIN 01011010
542 DATA BIN 01011010
543 DATA BIN 01011010
544 DATA BIN 00111100
545 DATA BIN 01111110
546 DATA BIN 01100110
547 DATA BIN 00000000
550 DATA BIN 00000000
551 DATA BIN 00111000
552 DATA BIN 00111001
553 DATA BIN 00111011
554 DATA BIN 00111011
555 DATA BIN 00101111
556 DATA BIN 00011111
557 DATA BIN 00000000
560 DATA BIN 00000000
561 DATA BIN 11111111
562 DATA BIN 11111111
563 DATA BIN 11000111
564 DATA BIN 11000110
565 DATA BIN 11111101
566 DATA BIN 11111011
567 DATA BIN 00000000
570 DATA BIN 00000000
571 DATA BIN 11111111
572 DATA BIN 11111111
573 DATA BIN 11100011
574 DATA BIN 01100011
575 DATA BIN 10111111
576 DATA BIN 11011111
577 DATA BIN 00000000
580 DATA BIN 00000000
581 DATA BIN 00011100
582 DATA BIN 10011100
583 DATA BIN 11011100
584 DATA BIN 11101100
585 DATA BIN 11110100
586 DATA BIN 11111000
587 DATA BIN 00000000
600 DATA BIN 00000000
601 DATA BIN 00001111
602 DATA BIN 00101111
603 DATA BIN 01101111
604 DATA BIN 01101111
605 DATA BIN 01101111
606 DATA BIN 01101111
607 DATA BIN 00000000
610 DATA BIN 00000000
611 DATA BIN 11110000
612 DATA BIN 11110100
613 DATA BIN 11110110
614 DATA BIN 11110110
615 DATA BIN 11110110
616 DATA BIN 11110110
617 DATA BIN 00000000
797 REM ---------------
798 REM draw background
799 REM ---------------
800 FOR y=2 TO 19
805 FOR x=0 TO 28 STEP 8
810 PRINT AT y,x; INK 3;"bc"; I
NK 6;"bcbc"; INK 4;"bc"
815 NEXT x: NEXT y
820 FOR y=20 TO 21
825 FOR x=0 TO 30 STEP 2: LET r
=-.5: IF y=2*INT (y/2) THEN LET
r=.5
830 PRINT AT y,x; INK 3.5+r;"a"
; INK 6; INK 3.5-r;"a"
835 NEXT x: NEXT y
840 RETURN
847 REM ------------------------
848 REM read data & print title
849 REM ------------------------
850 FOR k=0 TO 87
855 READ n: POKE USR "a"+k,n
860 NEXT k
865 DIM l(17)
870 BORDER 7: PAPER 0: BRIGHT 1
: CLS
875 PRINT BRIGHT 0; PAPER 7; I
NK 0;"0000   MANHATTAN INVASION
 0000____________________________
______"
885 RETURN
```



SPACE-HOG

RUNS ON AN ATARI

This simple but effective game demonstrates well the stereo 3-D capabilities of the Atari computer. As I've already said elsewhere, it's important to get as pure a red and blue as possible for stereo viewing. In this respect the Atari is ideal because you can actually program the intensity — or luminance, as the manual calls it — of the colours. Thus an excellent colour balance is achieved.

In Space-Hog, you take the role of a kamikaze star-pilot who just loves bumping into other spaceships! In the foreground of the scene is a mountain range and just peeping from behind it a second range of mountains deeper into the screen. Scattered throughout the depths of space are asteroids.

You pilot a ship at the left-hand edge of the screen and you can control its upward and downward motion plus movement INTO and OUT of the screen.

This is vital because your victims are flying from right to left across the screen at any of four different depths, as well as at different heights. For each ship you manage to crash into you gain fifty points — but remember your ship must be at the same depth as the victim to collide.

To get maximum screen space for the stereo action, there's no on-screen scoring for Space-Hog. The other compromise made is to restrict movement to only two objects at a time — your ship and the victim.

It is possible to put more ships on the screen at once but there is a price to pay — the game slows down considerably with each extra ship. Having said that, I have included a speed setting which ranges from 0 (slow) to 9 (fast). Before each game starts you must choose a speed to play.

Program notes

Lines 520-540 define the red, blue and purple used on-screen. The last number on each line defines the colour intensity. I have used values which work well on my TV but if these colours don't come out distinctly on your own TV you should try altering the intensity appropriately.

```
1 DIM COL(3)
10 GOTO 200
17 REM -----------------------------
18 REM PRINT SHAPE S AT XX,YY, COL C
19 REM -----------------------------
20 COLOR (S+COL(C)):PLOT XX,YY:RETURN
27 REM ---------------
28 REM PRINT OWN SHIP
29 REM ---------------
30 S=OWN:C=0:XX=OLX:YY=OLY:GOSUB20
31 XX=OLX+OLZ:GOSUB 20
32 OLX=OX:OLY=OY:OLZ=OZ
33 IF OZ=0 THEN 36
34 C=1:XX=OX:YY=OY:GOSUB 20
35 C=2:XX=OX+OZ:GOSUB 20:RETURN
36 C=3:XX=OX:YY=OY:GOSØB 20
37 RETURN
47 REM -----------------
48 REM PRINT ENEMY SHIP
49 REM -----------------
50 S=ENEMY:C=0:XX=ELX:YY=ELY:GOSUB 20
51 XX=ELX+ELZ:GOSUB 20
52 IF EZ=0 THEN 55
53 C=1:XX=EX:YY=EY:GOSUB 20
54 C=2:XX=EX+EZ:GOSUB 20:RETURN
55 C=3:XX=EX:YY=EY:GOSUB 20
```

```
56 RETURN
67 REM -------------
68 REM SHIP COLLISION
69 REM -------------
70 FOR K=0 TO 200
71 SOUND 1,K,14,15
72 NEXT K
73 SOUND 1,0,0,0
74 SCORE=SCORE+50
75 RETURN
87 REM ------------
88 REM SCAN JOYSTICK
89 REM ------------
90 JY=STICK(0)
91 IF JY=11 AND OZ>0 THEN OZ=OZ-1
92 IF JY=7 AND OZ<3 THEN OZ=OZ+1
93 IF JY=14 AND OY>0 THEN OY=OY-2
94 IF JY=13 AND OY<20 THEN OY=OY+2
95 RETURN
97 REM ------------
98 REM MAIN PROGRAM
99 REM ------------
100 OX=0:OY=10:OZ=0
105 SCORE=0:COUNT=0
110 EX=16:EY=2*INT(RND(0)*10)
120 EZ=INT(RND(0)*4)
130 FOR K=0 TO (9-SPEED)*10:NEXT K
140 GOSUB 90
150 GOSUB 50
160 GOSUB 30
170 IF EX=OX AND EY=OY AND EZ=OZ
    THEN GOSUB 70
180 ELX=EX:ELY=EY:ELZ=EZ
190 EX=EX-1:IF EX>-1 THEN 130
191 COUNT=COUNT+1
192 IF COUNT<30 THEN 110
197 REM ----------
198 REM GAME START
199 REM ----------
200 GRAPHICS 0
201 SETCOLOR 1,13,12
202 SETCOLOR 2,13,0
203 SOUND 0,0,0,0
210 POSITION 14,2:PRINT
    "SPACE-HOG"
220 POSITION 10,4;
    PRINT!"BY MIKE SINGLETON"
230 POSITION 6,6:
    PRINT "FOR COMPUTER & VIDEO GAMES"
240 PRINT:PRINT
250 PRINT "YOU SCORED ";SCORE
260 PRINT "YOUR SPEED WAS ";SPEED
270 PRINT
275 IF SCORE>HIGH THEN HIGH=SCORE
280 PRINT "THE HIGHEST SCORE
    DO YOU WANT NOW ";
290 PRINT:PRINT
300 PRINT "WHAT SPEED
    SO FAR IS ";HIGH
310 INPUT SPEED
320 IF SPEED<0 OR
    SPEED>9 THEN 300
497 REM ---------------------
498 REM SET COLOURS & SHAPES
499 REM ---------------------
500 GRAPHICS 17
510 SETCOLOR 0,0,0
520 SETCOLOR 1,3,4
530 SETCOLOR 2,7,4
540 SETCOLOR 3,5,6
550 SOUND 0,13,4,4
560 OWN=74
570 ENEMY=72
580 ASTROID=84
590 MOUNTL=70:MOUNTR=71
600 COL(0)=-32
610 COL(1)=-64
620 COL(2)=96
630 COL(3)=64
640 POKE 756,226
697 REM --------------
698 REM DRAW MOUNTAINS
699 REM --------------
700 FOR K=0 TO 10 STEP 10
710 YY=21
720 C=3:XX=K+1:S=MOUNTL:GOSUB 20
725 XX=K+2:S=MOUNTR:GOSUB 20
730 C=1:XX=K+3:S=MOUNTL:GOSUB 20
735 XX=K+4:S=MOUNTR:GOSUB 20
740 C=2:XX=K+5:S=MOUNTL:GOSUB 20
745 XX=K+6:S=MOUNTR:GOSUB 20
750 C=3:XX=K+7:S=MOUNTL:GOSUB 20
755 XX=K+8:S=MOUNTR:GOSUB 20
760 YY=22
765 C=3:XX=K:S=MOUNTL:GOSUB 20
770 XX=K+3:S=MOUNTR:GOSUB 20
775 C=2:XX=K+4:S=MOUNTL:GOSUB 20
780 C=1:XX=K+5:S=MOUNTR:GOSUB 20
785 C=3:XX=K+6:S=MOUNTL:GOSUB 20
790 XX=K+9:S=MOUNTR:GOSUB 20
795 YY=23:XX=K+4:GOSUB 20
800 XX=K+5:S=MOUNTL:GOSUB 20
805 NEXT K
897 REM -------------
898 REM DRAW ASTROIDS
899 REM -------------
900 S=ASTROID
910 FOR YY=1 TO 19 STEP 2
920 XX=INT(RND(0)*12)+4
930 ZZ=INT(RND(0)*3+1)
940 C=1:GOSUB 20
950 C=2:XX=XX+ZZ:GOSUB20
960 NEXT YY
970 GOTO 100
READY.
```



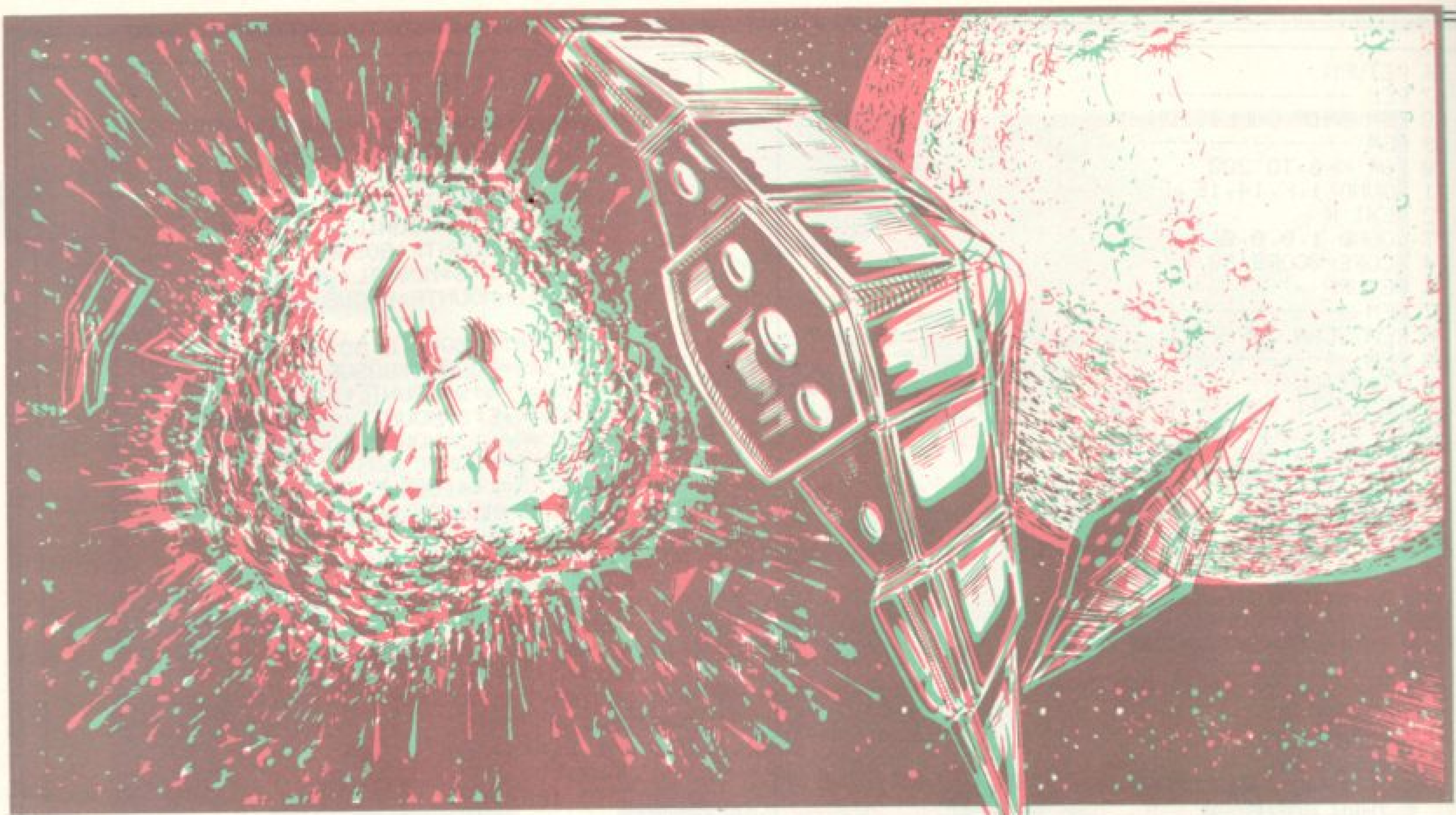
Variables

COL ( ):	colour adjustment for character printing
C:	colour to print in (0-3)
S:	code of shape to print
XX,YY:	X,Y coordinates to print at
OX,OY,OZ:	X,Y,Z coordinates of own ship
OLX,OLY,OLZ:	last X,Y,Z coordinates of own ship
EX,EY,EZ:	X,Y,Z coordinates of enemy ship
ELX,ELY,ELZ:	last X,Y,Z coordinates of enemy ship
JY:	joystick value
SCORE:	current score
COUNT:	number of ships so far
HIGH:	current high score

OWN, ENEMY, ASTROID, MOUNTL, MOUNTR: character codes for shapes.

Controls

Use a joystick in port 1 of your machine. To start a game enter a speed between 0 and 9 inclusive. When you move your joystick left you will move OUT of screen. Move it and you will move back INTO the screen. Up and down movements are controlled as normal.



CRASH OR CRUSH

RUNS ON A VIC-20 AND CBM 64

This simple stereo game is essentially the same program on both machines, with slight adjustments for different screen locations, screen sizes and sound commands.

The trick used in Crash or Crush to speed up movement in Basic is that most of the moving objects are continually scrolling up the screen. The only object that doesn't scroll is your own "crusher" ship which is continually poked in at the top of the screen.

Using this trick, it's possible to have ships moving quite quickly at all sorts of depths. You control the "crusher" at the top of the screen and you can move it left or right or INTO or OUT OF the screen.

Coming up the screen at you are asteroids and triangular spaceships. Like a sort of interstellar Steptoe and Son, you are after any old iron and must catch the triangular ships in the arms of your crusher.

To do this you not only have to be in the right horizontal position, you also have to be at the right depth. At the same time you have to avoid bumping

```
10 GOTO 500
17 REM ----------------------
18 REM PRINT SHIPS & ASTEROIDS
19 REM ----------------------
20 X=INT(RND(1)*28):Z=INT(RND(1)*6+1)
21 P$=R$:IF RND(1)>.8 THEN P$=S$
22 IF FLAG THEN P$=""
23 FLAG=1-FLAG:PRINT " ":
24 IF Z=1 THEN PRINT TAB(X);"■";P$:RETURN
25 PRINT TAB(X);"";P$:LEFT$("▶▶▶▶▶▶▶▶▶▶▶▌",Z-2);"";P$:RETURN
27 REM ------------
28 REM PRINT CRUSHER
29 REM ------------
30 IF ZZ>1 THEN 33
31 POKESS+XX,236:POKESS+XX+1,251:POKECS+XX,4:POKECS+XX+1,4
32 POKESS+XX,236:POKESS+XX+1,251:POKECS+XX,4:POKECS+XX+1,4:RETURN
33 POKESS+XX,236:POKESS+XX+1,251:POKECS+XX,2:POKECS+XX+1,2
34 POKESS+XX+ZZ,236:POKESS+XX+1+ZZ,251:POKECS+XX+ZZ,6:POKECS+XX+1+ZZ,6
35 RETURN
37 REM ------------
38 REM KEYBOARD SCAN
39 REM ------------
40 KY=PEEK(197)
41 FORK=1 TO 30:NEXT
42 IFKY=12ANDXX>1THENXX=XX-1
43 IFKY=23ANDXX<28THENXX=XX+1
44 IFKY=55ANDZZ>1THENZZ=ZZ-1
45 IFKY=50ANDZZ<6THENZZ=ZZ+1
46 FORK=1 TO 30:NEXT:RETURN
47 REM --------------------
48 REM DETECT CRASH OR CRUSH
49 REM --------------------
50 IF ZZ=1 THEN 60
51 A1%=PEEK(SS+XX):A2%=PEEK(SS+XX+ZZ)
52 B1%=PEEK(SS+XX+1):B2%=PEEK(SS+XX+ZZ+1)
53 IF A1%=81 AND A2%=81 THEN CRASH=CRASH+1:POKE SID+4.0:POKE SID+4,129
54 IF B1%=81 AND B2%=81 THEN CRASH=CRASH+1:POKE SID+4.0:POKE SID+4,129
55 IF A1%=233 AND A2%=233 THEN SO=SO+50:POKE SID+11.0:POKE SID+11,129
57 RETURN
60 A1%=PEEK(SS+XX):B1%=PEEK(SS+XX+1)
61 A2%=PEEK(CS+XX) AND 15:B2%=PEEK(CS+XX+1) AND 15
62 IF A1%=81 AND A2%=4 THEN CRASH=CRASH+1:POKE SID+4.0:POKE SID+4,129
```

into the asteroids — but don't worry too much for if they're at the wrong depth they won't harm you.

A crash or crush sound accompanies any collision and you score 50 points for crushing a ship but lose 100 points for a crash. The game ends after 250 objects have made their way up the screen.

The drawback with the scrolling trick is that you can't have on-screen scoring so a separate display deals with this. The other "odd" thing about the game is the keyboard scan routine. Some of you may already be familiar with the method but if you aren't, it's something worth remembering for your own games.

Peeking 197 on the CBM 64 or 203 on the Vic-20 will return a key code corresponding to the last key pressed. It is NOT an ASCII code but an internal keyboard matrix code — which you should work out by experiment. The advantage over GET K$ is that you can scan for continual key presses rather than single key presses.

The Vic version of Crash or Crush runs on a 3.5K Vic but to make it run with more RAM, just alter line 600 which sets the screen start (SS) and colour ram start (CS) location to values appropriate to the 3.5k Vic.

On both the Commodore machines, colour balance is critical if you are to see the stereo effect properly. The television may need delicate tuning to get the best colour possible and judicious fiddling with the contrast and brilliance is usually necessary. In particular, don't get the picture too bright. On the CBM 64, I found the colour balance particularly awkward. If you simply can't get the colour right on your 64, try the following alteration to 610: 610 PRINT " CLS ";: POKE 53280,0: POKE 53281,11

This creates a black border with a dark grey screen and the red and blue are more distinct through each lens. The only drawback is that the image tends to look rather blurred despite the colours contrasting more!

```
63 IF B1%=81 AND B2%=4 THEN CRASH=CRASH+1:POKE SID+4,0:POKE SID+4,129
64 IF A1%=233 AND A2%=4 THEN SO=SO+50:POKE SID+11,0:POKE SID+11,129
66 RETURN
197 REM ------------
198 REM MAIN PROGRAM
199 REM ------------
200 FORK=1TO30:PRINT:NEXT
210 GOSUB 20:REM PRINT SHIPS & ASTROIDS
220 GOSUB 50:REM CRASH OR CRUSH ?
230 GOSUB 30:REM PRINT OWN SHIP
240 GOSUB 40:REM SCAN KEYBOARD
250 COUNT=COUNT+1
260 IF COUNT<500 THEN 210
270 GOTO 700
497 REM -------------
498 REM SET UP SOUNDS
499 REM -------------
500 SID=54272
510 FOR L=0 TO 24:POKE SID+L,0:NEXT
520 POKE SID+24,15
530 POKE SID+1,10
540 POKE SID+5,11
550 POKE SID+8,3
560 POKE SID+12,16*8+11
597 REM ------------------------------
598 REM SET VARIABLES & SCREEN COLOUR
599 REM ------------------------------
600 SS=1024:CS=55296
610 PRINT"[CLR]";:POKE53280,1:POKE53281,0
620 S$="[graphics]":R$="[graphics] "
697 REM ----------
698 REM GAME START
699 REM ----------
700 PRINT"[CLR]"
710 PRINT"                    CRASH OR CRUSH"
720 PRINT:PRINT"               BY MIKE SINGLETON"
730 PRINT:PRINT"      FOR COMPUTER & VIDEO GAMES"
740 PRINT:PRINT:PRINT
745 IF SO-CRASH*100>HIGH THEN HIGH=SO-CRASH*100
750 PRINT" YOU SCORED";SO
760 PRINT:PRINT" YOU CRASHED";CRASH;"TIME";:IF CRASH<>1 THEN PRINT"S";
765 PRINT
770 PRINT:PRINT" YOUR TOTAL PROFIT WAS ";SO-CRASH*100
780 PRINT:PRINT:PRINT" THE HIGHEST PROFIT SO FAR IS";HIGH
790 PRINT:PRINT:PRINT" PRESS S TO START A NEW GAME"
800 GET G$:IF G$<>"S" THEN 800
810 XX=15:ZZ=2
820 SO=0:CRASH=0:COUNT=0
830 GOTO 200
READY.
```

VIC-20 LISTING

```
10 GOTO 500
17 REM -----------
18 REM PRINT SHIPS
19 REM -----------
20 X=INT(RND(1)*11):Z=INT(RND(1)*6+1)
21 P$=R$:IF RND(1)>.8 THEN P$=S$
22 IF FLAG THEN P$=""
23 FLAG=1-FLAG
24 IF Z=1 THEN PRINT TAB(X);"[graphics]";P$:RETURN
25 PRINT;TAB(X);"";P$:LEFT$("[graphics]",Z-2);"";P$:RETURN
27 REM -------------
28 REM PRINT CRUSHER
29 REM -------------
30 IF ZZ>1 THEN 33
31 POKECS+XX,4:POKECS+XX+1,4:POKESS+XX,236:POKESS+XX+1,251
32 POKECS+XX,4:POKECS+XX+1,4:POKESS+XX,236:POKESS+XX+1,251:RETURN
33 POKECS+XX,2:POKECS+XX+1,2:POKESS+XX,236:POKESS+XX+1,251
34 POKECS+XX+ZZ,6:POKECS+XX+1+ZZ,6:POKESS+XX+ZZ,236:POKESS+XX+1+ZZ,251
35 RETURN
37 REM -------------
38 REM KEYBOARD SCAN
39 REM -------------
40 KY=PEEK(203)
41 FORK=1 TO 30:NEXT
42 IFKY=33ANDXX>0THENXX=XX-1
43 IFKY=26ANDXX<14THENXX=XX+1
44 IFKY=30ANDZZ>1THENZZ=ZZ-1
45 IFKY=22ANDZZ<6THENZZ=ZZ+1
```

```
46 FORK=1 TO 30:NEXT:RETURN
47 REM --------------
48 REM DETECT CONTACT
49 REM --------------
50 IF ZZ=1 THEN 60
51 A1%=PEEK(SS+XX):A2%=PEEK(SS+XX+ZZ)
52 B1%=PEEK(SS+XX+1):B2%=PEEK(SS+XX+ZZ+1)
53 IF A1%=81 AND A2%=81 THEN CRASH=CRASH+1:POKE NOISE,130
54 IF B1%=81 AND B2%=81 THEN CRASH=CRASH+1:POKE NOISE,130
55 IF A1%=233 AND A2%=233 THEN SO=SO+50:POKE SID+11,0:POKE NOISE,250
57 RETURN
60 A1%=PEEK(SS+XX):B1%=PEEK(SS+XX+1)
61 A2%=PEEK(CS+XX) AND 15:B2%=PEEK(CS+XX+1) AND 15
62 IF A1%=81 AND A2%=4 THEN CRASH=CRASH+1:POKE NOISE,130
63 IF B1%=81 AND B2%=4 THEN CRASH=CRASH+1:POKE NOISE,130
64 IF A1%=233 AND A2%=4 THEN SO=SO+50:POKE NOISE,250
66 RETURN
197 REM ------------
198 REM MAIN PROGRAM
199 REM ------------
200 FORK=1TO30:PRINT:NEXT
210 GOSUB 20:REM PRINT SHIPS & ASTROIDS
215 POKE NOISE,0
220 GOSUB 50:REM CRASH OR CRUSH ?
230 GOSUB 30:REM PRINT OWN SHIP
240 GOSUB 40:REM SCAN KEYBOARD
250 COUNT=COUNT+1
260 IF COUNT<500 THEN 210
270 GOTO 700
497 REM ------------
498 REM SET UP SOUNDS
499 REM ------------
500 VOL=36878
510 NOISE=36877
520 POKE VOL,15
597 REM ------------
598 REM SET VARIABLES
599 REM ------------
600 SS=7680:CS=38400
610 PRINT"[illegible]";:POKE36879,9
620 S$="[illegible]":R$="[illegible] "
697 REM ------------
698 REM GAME START
699 REM ------------
700 PRINT"[illegible]"
710 PRINT"     CRASH OR CRUSH"
720 PRINT:PRINT"  BY MIKE SINGLETON"
725 PRINT:PRINT"          FOR"
730 PRINT:PRINT"COMPUTER & VIDEO GAMES"
740 PRINT:PRINT
745 IF SO-CRASH*100>HIGH THEN HIGH=SO-CRASH*100
750 PRINT"SCORED";SO
760 PRINT:PRINT"CRASHED";CRASH;"TIME";:IF CRASH<>1 THEN PRINT"S";
765 PRINT:PRINT
770 PRINT"TOTAL PROFIT";SO-CRASH*100
780 PRINT:PRINT"HIGHEST PROFIT";HIGH
790 PRINT:PRINT:PRINT:PRINT"    PRESS S TO START"
800 GET G$:IF G$<>"S" THEN 800
810 XX=6:ZZ=2
820 SO=0:CRASH=0:COUNT=0
830 GOTO 200
READY.
```

Variables

X, Z:	X and Z co-ordinates of new objects on screen
XX, ZZ:	X and Z co-ordinates of "crusher"
A1%, B1%, A2%, B2%:	peek of what's on screen just where the crusher is about to be printed — used for collision detection.
KY:	last key press
SS:	screen start location
CS:	colour ram start location
FLAG:	flag used to print objects only on alternate lines (FLAG = 0 or 1)
COUNT:	counter to time length of game
SO:	current score
CRASH:	current number of crashes
P$:	string of current object to print
S$:	string of enemy ship
R$:	string of asteroid
NOISE:	location of white noise generator (Vic-20 only)
VOL:	location of volume control (Vic-20 only)
SID:	location of sound chip registers (CBM-64 only)

Controls

S=start, Z=left, X=right, ?=move out of screen, ;=move into screen.


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```
  10 LET dl=9000: LET ol=9500: L
ET vl=9700
  20 DIM f(6): DIM o(14)
  30 RESTORE 9300: FOR n=1 TO 14
  40 READ o(n): NEXT n: LET l=2
 100 POKE 23692,255: PRINT  INK
RND*4;"
    "
 105 IF l=-1 THEN  GO TO 6000
 110 RESTORE dl+l*10
 120 READ d$,north,south,west,ea
st
 130 PRINT "You are at ";: LET p
=11
 140 FOR n=1 TO LEN d$: IF CODE
d$(n)<CODE "8" AND CODE d$(n)>=C
ODE "0" THEN  INK VAL d$(n): GO
TO 160
 150 PRINT d$(n);: LET p=p+1: IF
 p>24 AND d$(n)=" " THEN  PRINT
: LET p=0
 160 NEXT n
 180 PRINT "."'"directions you m
ay proceed in"
 190 IF l=12 AND f(3)=0 THEN  LE
T south=0
 200 IF l=8 AND f(4)=0 THEN  LET
 west=0
 210 IF l=4 AND f(1)=0 THEN  LET
 east=0
 220 IF north<>0 THEN  PRINT ,"N
orth"
 230 IF south<>0 THEN  PRINT ,"S
outh"
 240 IF east<>0 THEN  PRINT ,"Ea
st"
 250 IF west<>0 THEN  PRINT ,"We
st"
 300 PRINT '"Things of intrest h
ere:"
 310 LET nh=0: FOR n=1 TO 14: IF
 o(n)=l THEN  LET nh=nh+1: RESTO
RE ol+n*10: READ x$,y$: PRINT y$
;" ";x$
 320 NEXT n: IF nh=0 THEN  PRINT
 "None"
 330 IF l=8 AND f(4)=0 THEN  PRI
NT "There is a small slot on the
    west wall."
 340 IF l=4 AND f(1)=-1 THEN  PR
INT "The dragon decides he doesn
't   like you, so he kills you."
: GO TO 8000
 350 IF l=4 AND f(1)=0 THEN  PRI
NT "The nasty dragon is Blocking
 a  hole in the EAST wall.": LET
 f(1)=-1
 360 IF l<>4 AND f(1)=-1 THEN  L
ET f(1)=0
 370 IF l=4 AND f(1)=1 THEN  PRI
NT "The dragon is dead"
```

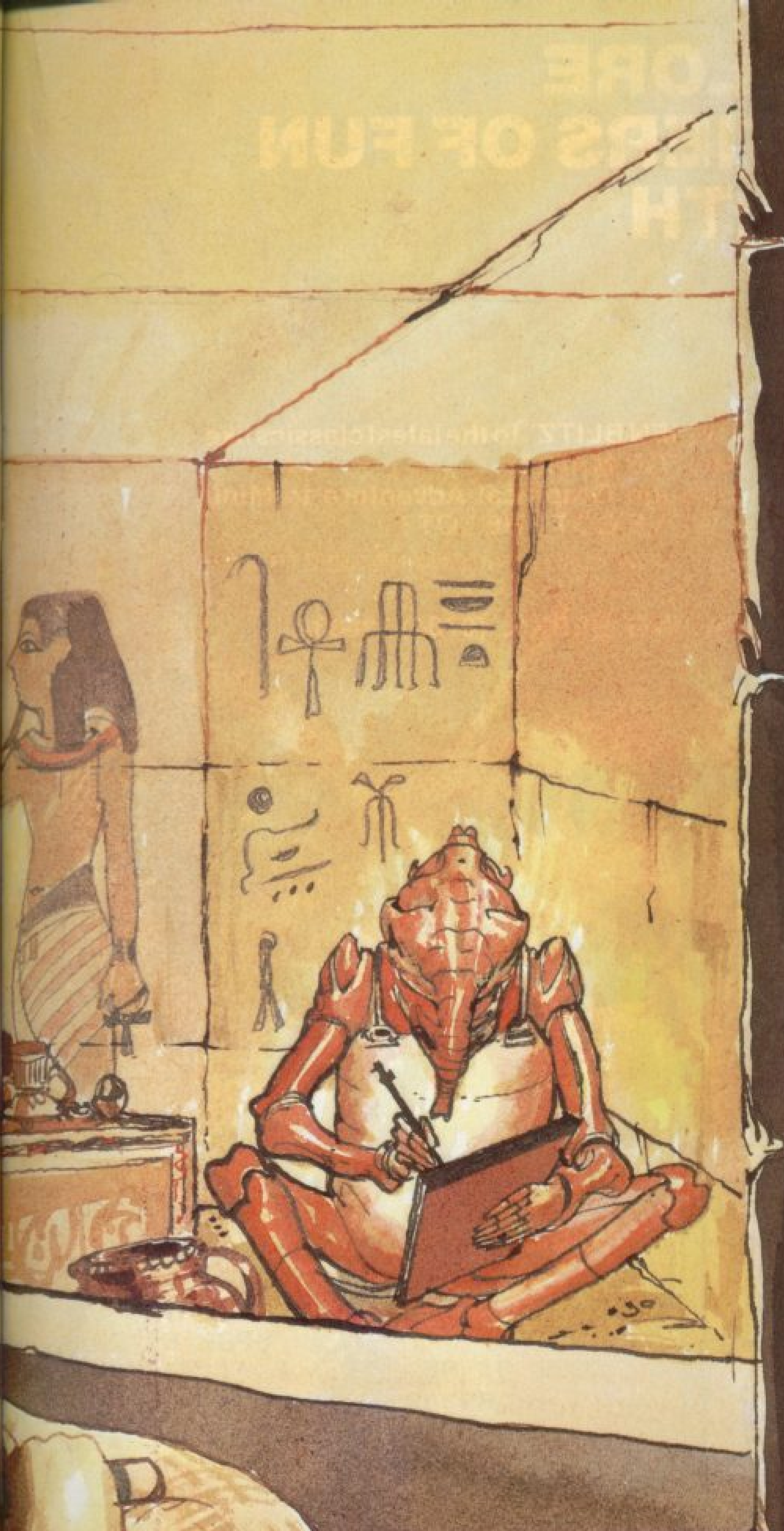
Illustrations: Jon Davis



VENTURE

Extract from a time-traveller's diary discovered in the pyramid of Ikhotep, pharoah of the ninth dynasty, on the planet Sirius B, in the dog star system.

"I have been attempting to discover the secret of the pyramid for some months now. It is the only way I will be able to escape this barren planet. After my time-machine was destroyed by the warrior tribe I found my way to this dusty monument after consulting a man they regard as a wizard. He is in fact a fellow traveller in time and space exiled by the Time Lords to this lost planet. He has decided to stay and persue his black arts among the warrior folk. But he has told me of a time gate which will lead me back to the main time lanes and freedom. He said the gate was hidden



16

BY A. CLAPHAM

RUNS ON A SPECTRUM IN 16K

within the pyramid. I have uncovered some clues but not enough to lead me to the final solution. I can only keep trying. But I feel that, for me at least, time is running out."

The diary was found next to a small pile of oddly shaped bones deep within the heart of the pyramid.

Can you find your way out of the pyramid and off the barren planet? You will find several rooms within the pyramid and several objects within those rooms which must be collected to solve the riddle of the ancient monument. The program uses the standard two word entry system and adjectives should not be entered. To move simply type in the direction you wish to go, for example: 'N' or 'north'. Other useful words are **TAKE, GET, THROW, DROP, INVENTORY**.

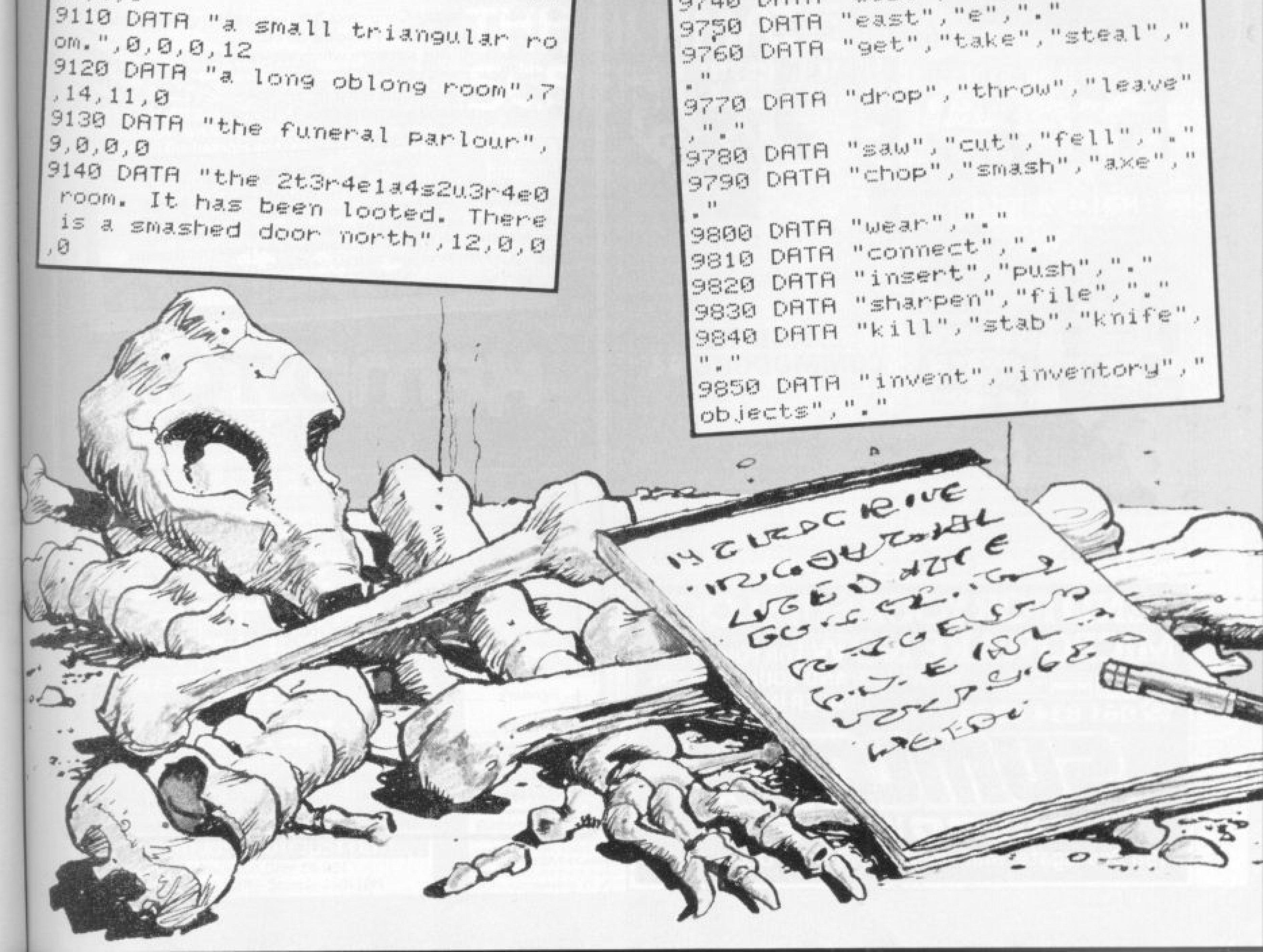
```
 380 IF l=16 AND f(2)=0 THEN  PR
INT "There is something glisteni
ng atthe top of the tree."
 390 IF l=16 AND f(2)=1 THEN  PR
INT "The tree is lying on the gr
ound"
 400 IF (l=12 AND f(3)=1) OR l=1
4 THEN  PRINT "The door is smash
ed down."
 410 GO SUB 5000
 420 IF vn<5 THEN  GO TO vn*50+4
00
 430 IF vn=5 THEN  GO TO 630
 440 GO TO vn*50+350
 500 IF north=0 THEN  GO TO 3000
 510 LET l=north: GO TO 3300
 550 IF south=0 THEN  GO TO 3000
 560 LET l=south: GO TO 3300
 600 IF west=0 THEN  GO TO 3000
 610 IF l=0 THEN  GO TO 6000
 620 LET l=west: GO TO 3300
 630 IF east=0 THEN  GO TO 3000
 640 LET l=east: GO TO 3300
 650 IF o(on)=-1 THEN  PRINT "YO
U ARE ALREADY CARRYING IT !!!!":
 GO TO 410
 655 IF o(1)<>-1 AND on<>1 THEN
 PRINT "YOU HAVEN'T GOT ANYTHING
 TO CARYIT IN!!!": GO TO 410
 660 IF o(on)<>l THEN  GO TO 320
0
 670 RESTORE ol+on*10: READ x$,y
$,z
 680 IF z=0 THEN  GO TO 3000
 685 IF on=1 THEN  LET o(on)=-1:
 PRINT "YOU STRAP IT TO YOUR WRI
ST": GO TO 3300
 690 LET o(on)=-1: PRINT "IT ZOO
MS SAFELY INTO YOUR WATCH!": GO
TO 3300
 700 IF o(on)<>-1 THEN  GO TO 31
00
 710 LET o(on)=l: IF on=13 THEN
 LET f(5)=0: GO TO 3300
 720 GO TO 3300
 750 IF on<>4 OR f(2)=1 THEN  GO
 TO 3000
 760 IF o(3)<>-1 OR o(7)<>-1 THE
N  GO TO 3000
 761 IF l<>16 THEN  GO TO 3200
 765 IF f(6)=0 THEN  PRINT "The
saw won't work without      elec
tricity !!!!!!!!!!!!!!!!!!!": G
O TO 410
 770 IF f(5)=0 THEN  PRINT "The
tree falls down onto your    unpr
otected head. Crunch.         ": G
O TO 8000
 780 LET f(2)=1: PRINT "The tree
 falls down onto your    safety h
almet. An axe falls out the top
of the tree.": LET o(14)=1: GO T
O 3300
```


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```
800 IF on<>6 THEN  GO TO 3000
810 IF o(14)<>-1 OR f(3)=1 THEN
 GO TO 3000
815 IF l<>12 THEN  GO TO 3200
820 PRINT "Chop chop chop   sma
sh smash     The door has been sm
ashed down": LET f(3)=1: GO TO 3
300
850 IF on<>13 THEN  GO TO 3000
860 IF o(13)<>-1 THEN  GO TO 31
00
870 LET f(5)=1: GO TO 3300
900 IF on<>7 AND on<>3 THEN  GO
 TO 3000
905 IF o(on)<>-1 THEN  GO TO 31
00
910 IF o(7)<>-1 OR o(3)<>-1 THE
N  GO TO 3000
920 LET f(6)=1: GO TO 3300
950 IF on<>10 THEN  GO TO 3000
955 IF o(on)<>-1 THEN  GO TO 31
00
956 IF l<>8 THEN  PRINT "I can'
t see anywhere to insert  it !!!
!": GO TO 410
960 LET o(on)=0
970 PRINT "The wall suddenly sh
akes and     glides to one side l
eaving a     doorway west !!!!!!!
!!!!!!!!!!!": LET f(4)=1: GO TO
 3300
1000 IF on<>11 THEN  GO TO 3000
1005 IF o(on)<>-1 THEN  GO TO 31
00
1006 IF o(5)<>-1 THEN  PRINT "Yo
u haven't got anything to      sh
arpen it on !!!!!!!": GO TO 410
1010 PRINT "The knife turns extr
a sharp !!!!": LET o(11)=0: LET
o(12)=-1: GO TO 3300
1050 IF on<>2 OR o(12)<>-1 THEN
 GO TO 3000
1055 IF l<>4 THEN  GO TO 3200
1060 IF f(1)=1 THEN  PRINT "The
poor thing's already dead.  ": G
O TO 410
1070 LET f(1)=1: PRINT "Squelch.
 The dagger sinks to the hilt in
 the dragon. It's dead!  Poor th
ing.": GO TO 3300
1170 PRINT : PRINT '"You are car
rying:"
1180 LET nh=0: FOR n=1 TO 14: IF
 o(n)=-1 THEN  LET nh=nh+1: REST
ORE ol+n*10: READ x$,y$: PRINT y
$;" ";x$
1190 NEXT n: IF nh=0 THEN  PRINT
 "Nothing"
1200 GO TO 100
3000 PRINT "YOU CAN'T, IDIOT!!!!
": GO TO 410
3100 PRINT "You aren't carrying
it ,stupid!": GO TO 410
3200 PRINT "It isn't here!!!": G
O TO 410
3300 BEEP .1,20: PRINT  FLASH 1;
"COMMAND EXECUTED": GO TO 100
5010 INPUT "COMMAND "; LINE c$:
FOR n=1 TO LEN c$: IF CODE c$(n)
<=CODE "Z" THEN  LET c$(n)=CHR$
((CODE c$(n))+32): IF c$(n)="@"
THEN  LET c$(n)=" "
5020 NEXT n: PRINT "COMMAND ";c$
: FOR n=1 TO LEN c$: IF c$(n)="
" THEN  LET v$=c$( TO n-1): LET
n$=c$(n+1 TO ): GO TO 5050
5030 NEXT n
5040 LET v$=c$: LET n$="": LET n
o=0: GO TO 5100
5050 IF v$="go" OR v$="move" OR
v$="walk" OR v$="run" THEN  LET
c$=n$: GO TO 5040
5055 FOR n=1 TO 14: RESTORE ol+n
*10
5060 READ x$: IF n$=x$ THEN  LET
 on=n: GO TO 5100
5070 NEXT n
5080 PRINT "I don't know what a
"'n$;" is."
5090 BEEP .1,-20: GO TO 5000
5100 FOR n=1 TO 15: RESTORE vl+n
*10
5110 READ x$: IF x$="." THEN  GO
 TO 5140
5120 IF v$=x$ THEN  LET vn=n: RE
TURN
5130 GO TO 5110
5140 NEXT n
5150 PRINT "I don't know how to
"'v$;"."
5160 GO TO 5090
6000 PRINT "LAZER BOLTS FLASH OU
T FROM THE  KILLO-ZAP GUNS FIXED
 TO THE ROAD"
6010 IF o(9)<>-1 AND o(8)<>-1 TH
EN  PRINT "FRIZZZLE !!!!!!!!!":
GO TO 8000
6020 IF o(9)<>-1 THEN  PRINT "TH
E LEFT RAY IS REFLECTED BY THEMI
RROR. THE RIGHT RAY ISN'T !!!!":
 GO TO 8000
6030 IF o(8)<>-1 THEN  PRINT "TH
E RIGHT RAY IS REFLECTED BT    TH
E REFLECTOR. THE LEFT RAY      IS
N'T!!!!!!!!!!!!!!!!!!!!!": GO TO
 8000
6040 PRINT "BOTH THE RAYS ARE RE
FLECTED BY  THE MIRROR AND THE R
EFLECTOR!!!!"
6050 PRINT  FLASH 1;'"YOU HAVE M
ANAGED TO ESCAPE         ALIVE!!!!!
!!!!!!!!!!!!!!!!         ": GO TO 8
010
8000 PRINT  FLASH 1;"YOU'RE DEAD
!!!"
```

```
8010 INPUT "ANOTHER GO ?";o$: IF
 CODE o$<>CODE "n" THEN  RUN
9010 DATA "a road. Two metal thi
ngs are pointing at the road wes
t. The road leads west & east",0
,0,-1,2
9020 DATA "a bend in a road",0,5
,1,0
9030 DATA "a small dark shack",0
,0,0,5
9040 DATA "a small dark shack",0
,0,5,15
9050 DATA "a road leading north
& south. There are shacks either
 side",2,6,3,4
9060 DATA "a road leading north.
 There is a pyramid south",5,7,0
,0
9070 DATA "the entrance hall of
the pyramid of Yamoseht (Transla
tion- ~2orange ugly sugar basin0
 maker~). There is a road north"
,6,12,8,9
9080 DATA "the embalming room",0
,0,10,7
9090 DATA "the recreation room.
An exit to the 4garden0 is east"
,0,13,7,16
9100 DATA "the room of 1ANKH0",0
,0,0,8
9110 DATA "a small triangular ro
om.",0,0,0,12
9120 DATA "a long oblong room",7
,14,11,0
9130 DATA "the funeral parlour",
9,0,0,0
9140 DATA "the 2t3r4e1a4s2u3r4e0
room. It has been looted. There
is a smashed door north",12,0,0
,0
```

```
9150 DATA "a small circular cave
",0,0,4,0
9160 DATA "a small 4garden0.",0,
0,9,0
9310 DATA 3,4,2,16,13,12,11,10,1
5,14,5,0,7,0
9510 DATA "watch","wrist",1
9520 DATA "dragon","magenta, fir
ebreathing",0
9530 DATA "generator","mobile el
ectricity",1
9540 DATA "tree","Canadian Redwo
od",0
9550 DATA "slab","granite",1
9560 DATA "door","thick wooden",
0
9570 DATA "saw","electric",1
9580 DATA "mirror","purple",1
9590 DATA "reflector","green",1
9600 DATA "coin","10 pence",1
9610 DATA "knife","butter",1
9620 DATA "dagger","razor sharp"
,1
9630 DATA "helmet","safety",1
9640 DATA "axe","sharp",1
9710 DATA "go","move","run","wal
k","."
9720 DATA "north","n","."
9730 DATA "south","s","."
9740 DATA "west","w","."
9750 DATA "east","e","."
9760 DATA "get","take","steal","
."
9770 DATA "drop","throw","leave"
,"."
9780 DATA "saw","cut","fell","."
9790 DATA "chop","smash","axe","
."
9800 DATA "wear","."
9810 DATA "connect","."
9820 DATA "insert","push","."
9830 DATA "sharpen","file","."
9840 DATA "kill","stab","knife",
"."
9850 DATA "invent","inventory","
objects","."
```



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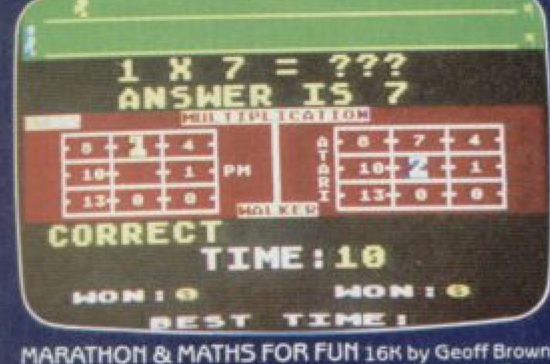
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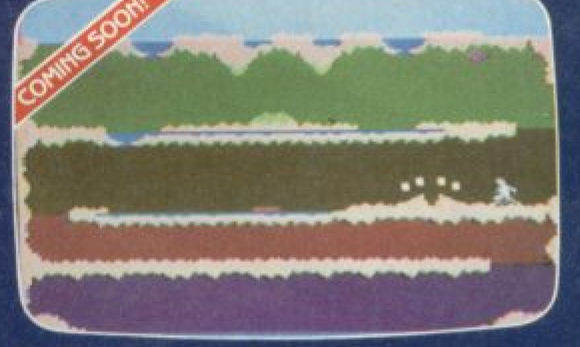


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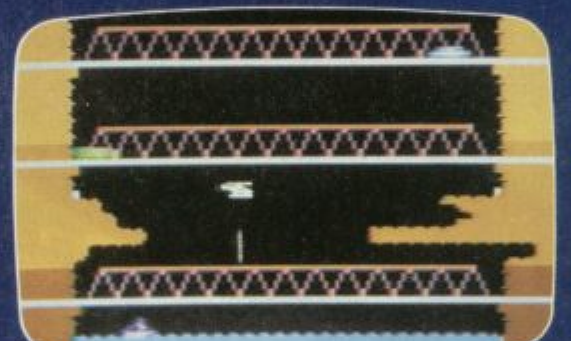


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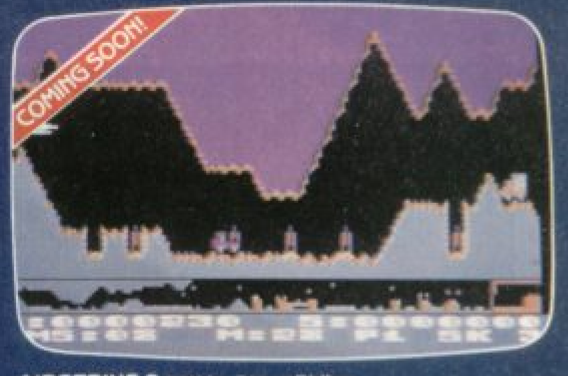
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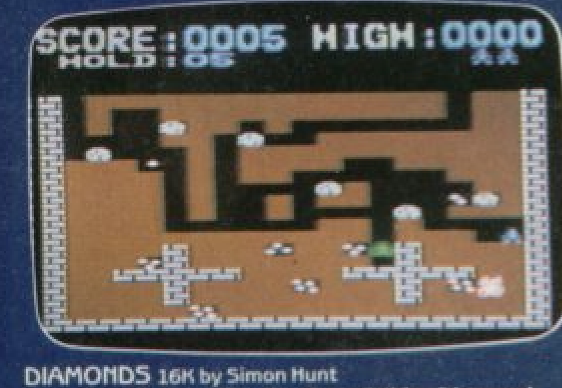
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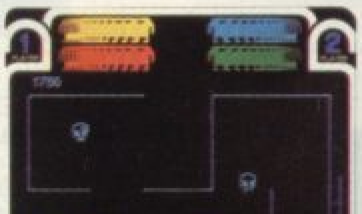
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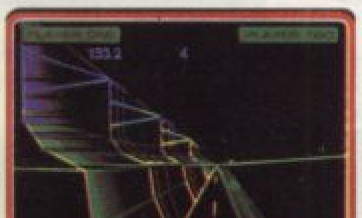


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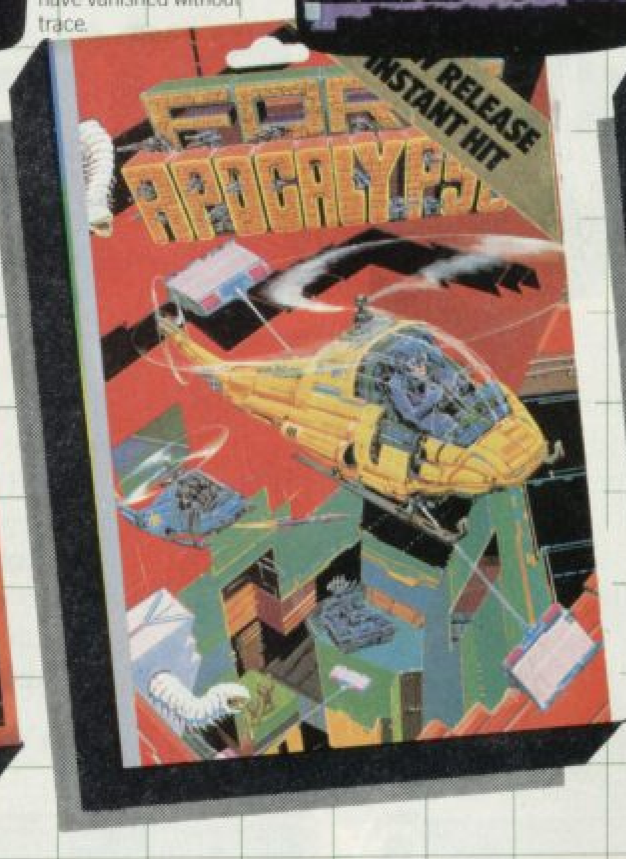
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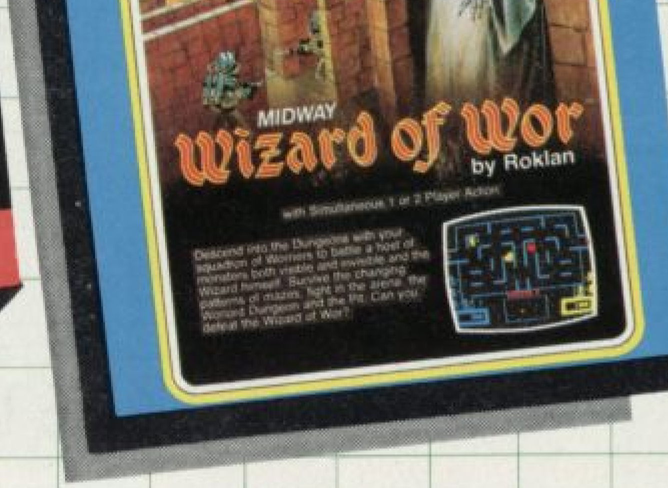
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Modata Computers Ltd.
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Kent. (0892) 41555.

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Percy Street, Newcastle-Upon-Tyne.
(0632) 616260.
York Computer Centre
7 Stonegate Arcade, York.
(0904) 641862.
Small Fry + Hobby
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Chester Software Centre
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Microspot
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Channel 8 Software
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Wildings Computer Centre
111 Bridge Street, Warrington,
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Wildings Computer Centre
11 Mesnes Street, Wigan.
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Bournemouth BH2 6HE.
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(0273) 698424.
Canterbury Software
9 The Friars, Canterbury CT1 2AS.
(0227) 53531.
Efficient Chips
40 The Market Place, Chippenham,
Wiltshire. (0249) 654321.
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Waterlooville, Portsmouth.
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(031) 557 4546.
Livingston Computer Centre
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Centre, Livingston. (0506) 36978.

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St Georges Crescent, Wrexham.
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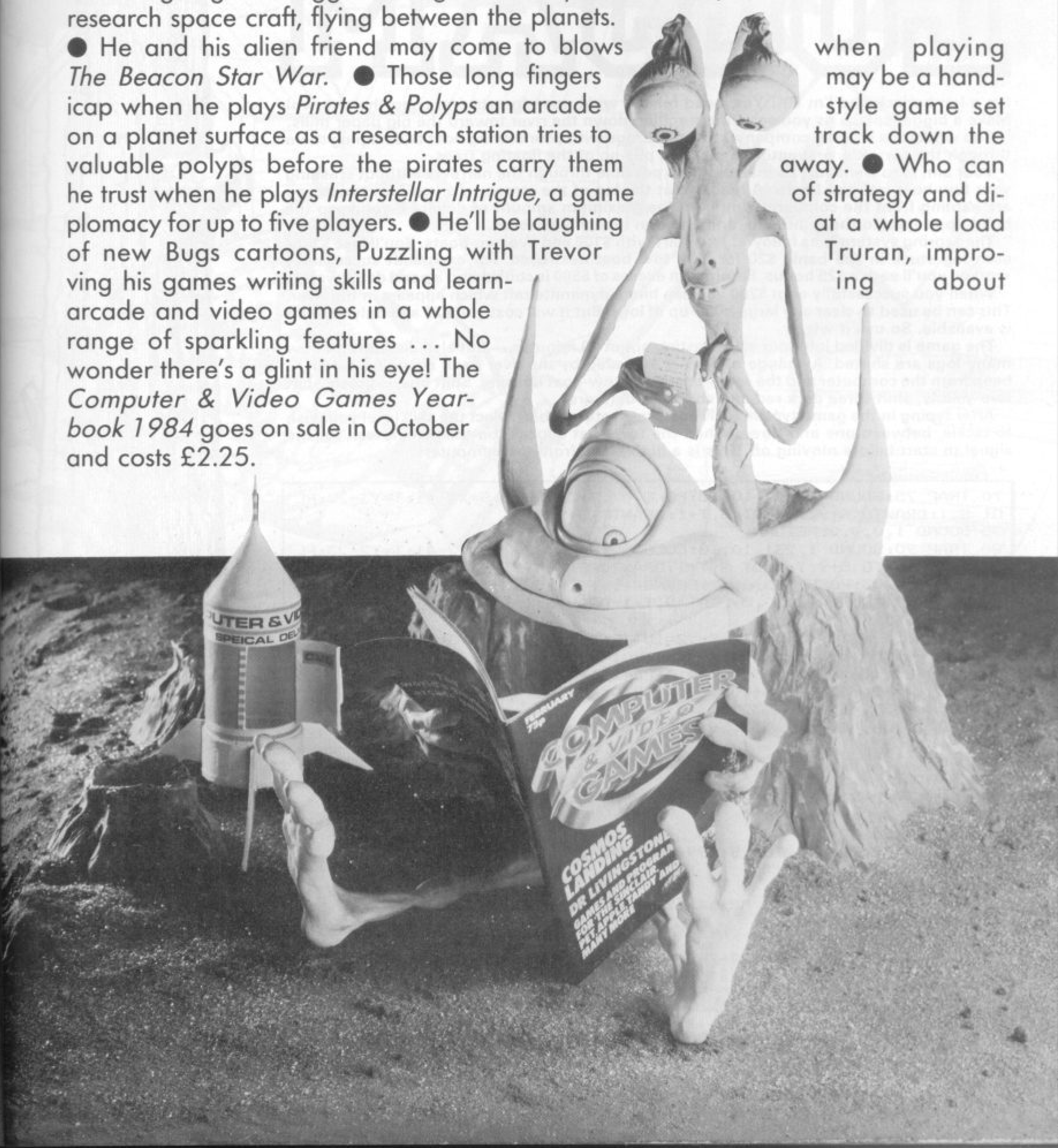
Can you face 1984 without our Yearbook?

The C&VG delivery is a real event in this outpost of the galaxy. It only arrives every other millennia when the comet goes past. But this little alien isn't going to miss out, he's just put in an order for *The Computer & Video Games Yearbook 1984.*

There's enough in it to keep him going for a couple of millennia. He'll be playing the four specially commissioned games, converted across a range of micros.

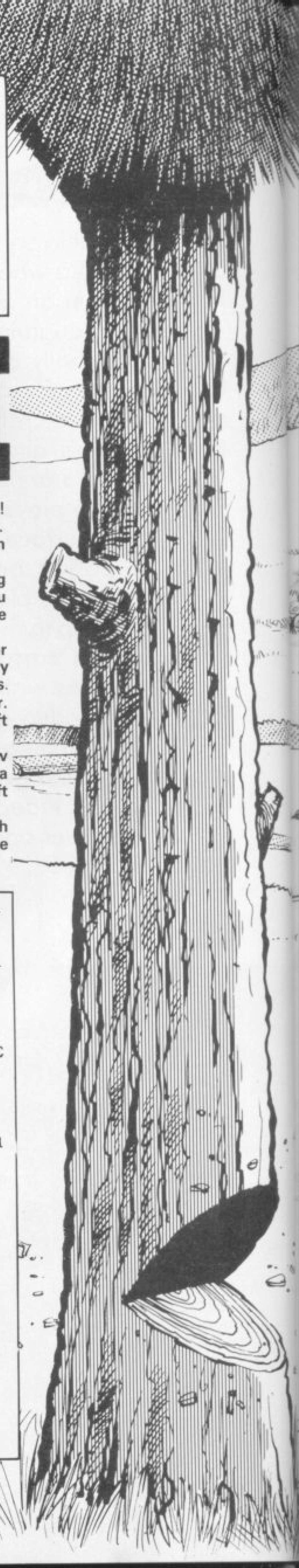
● He's going to struggle through *The Vespozian Affair,* an adventure set on a research space craft, flying between the planets.

● He and his alien friend may come to blows when playing *The Beacon Star War.* ● Those long fingers may be a handicap when he plays *Pirates & Polyps* an arcade style game set on a planet surface as a research station tries to track down the valuable polyps before the pirates carry them away. ● Who can he trust when he plays *Interstellar Intrigue,* a game of strategy and diplomacy for up to five players. ● He'll be laughing at a whole load of new Bugs cartoons, Puzzling with Trevor Truran, improving his games writing skills and learning about arcade and video games in a whole range of sparkling features ... No wonder there's a glint in his eye! The *Computer & Video Games Yearbook 1984* goes on sale in October and costs £2.25.



```
10 REM LOGJAM
12 REM BY STEPHEN LINGER
14 REM SPRINGFIELD CHELMSFORD
16 REM ESSEX ENGLAND
18 REM COPYRIGHT 1/1983
20 GOTO 8000
30 GRAPHICS 17:SETCOLOR 4,9,6:POSITION 4,6:? #6;"please wait":POS
ITION 8,8:? #6;"for"
35 POSITION 4,10:? #6;"ten seconds"
40 FOR W=1 TO 1500:NEXT W:POSITION 2,15:? #6;"drawing playfield"
45 FOR W=1 TO 1000:NEXT W
50 GOTO 5000
65 POKE 53250,5
```

LOGJAM



I'm a lumberjack and I'm OK! Yes, head for the wide open forests and chop them down! Make a bigger splash as you send them rolling down the river toward the big paper mills.

You work for a logging company, picking up logs with your towing boat and helping them through the narrows, preventing a massive pile-up of the floating trees.

Your aim is to transport as many logs as possible through the narrows without crashing your tow-boat into the banks. A read-out at the top of the screen tells you how much you are earning from the company. You earn the maximum amount of dollars if you keep the build up of logs to the minimum, and you don't crash your boat.

The scoring system is as follows: You start with $100 and five two-boats. You'll lose $1 for each log stuck in the bank, $20 for each tow boat destroyed. For each shift successfully worked you'll earn a $25 bonus. Earnings in excess of $500 is considered a good day's wages.

When you successfully earn $200 you can hire a dynamite raft which appears in the river. This can be used to clear any large build-up of logs. But it will cost you $20 and only one raft is available. So use it wisely.

The game is divided into four shifts lasting about 10 minutes — but also depends on how many logs are shifted. A change of shift is indicated by the river bank changing colour, a beep from the computer and the score-board and tow-boat flashing. Shift one, is green, shift two yellow, shift three dark red and shift four dark grey.

After typing in the game type in RUN and press return. Then select the skill level you wish to tackle, between one and three. When the tow-boat appears on the screen wait for the signal to start before moving off. This is a high bleep from the computer!

```
70 TRAP 75:SOUND 1,231,10,15:POKE 87,7:COLOR 2:S=X4-41:T=Y3-23:PL
OT S,T:DRAWTO S+9,T:PLOT S,T+1:DRAWTO S+9,T+1
75 SOUND 1,0,0,0:RETURN
80 TRAP 90:SOUND 1,231,10,10:COLOR 2:POKE 87,7:S=X2-41:T=Y2-23:PL
OT S,T:DRAWTO S+9,T:PLOT S,T+1:DRAWTO S+9,T+1
85 SL=SL+0.03:POKE 53278,17:SOUND 1,0,0,0:GOSUB 720:GOTO 298
90 TRAP 95:SOUND 1,0,0,0:PLOT S,T+1:DRAWTO 159,T+1:GOTO 298
95 GOTO 300
100 X1=83:X2=210:X3=5:Y1=67:Y2=INT(RND(0)*30)+40:Y3=32:R=0:L=0:SC
=100:PT=0:X5=5:Y5=61:CV=0:ZZ=0:PS=0:TM=0:LG=0
110 A=PEEK(106)-24:POKE 54279,A:PB=256*A
120 FOR J=PB+512 TO PB+1023:POKE J,0:NEXT J
130 POKE 559,46:POKE 53277,3
140 POKE 704,45:POKE 705,52:POKE 706,52:POKE 707,206:POKE 53257,1
:POKE 53258,1
145 POKE 53248,X1:POKE 53249,X2:POKE 53250,X3:POKE 53251,X5
148 RESTORE 155
150 FOR J=PB+512+Y1 TO PB+517+Y1:READ A:POKE J,A:NEXT J
155 DATA 63,96,224,224,96,63
160 RESTORE 180
170 FOR J=PB+896+Y5 TO PB+899+Y5:READ B:POKE J,B:NEXT J
180 DATA 31,31,31,31
195 RESTORE 210
200 FOR J=PB+640+Y2 TO PB+641+Y2:READ B:POKE J,B:NEXT J
210 DATA 31,31
215 RESTORE 230
220 FOR J=PB+768+Y3 TO PB+769+Y3:READ B:POKE J,B:NEXT J
230 DATA 31,31
235 IF Q=1 THEN 260
240 GOSUB 3000
250 GOSUB 3100
```

Illustration: Terry Rogers

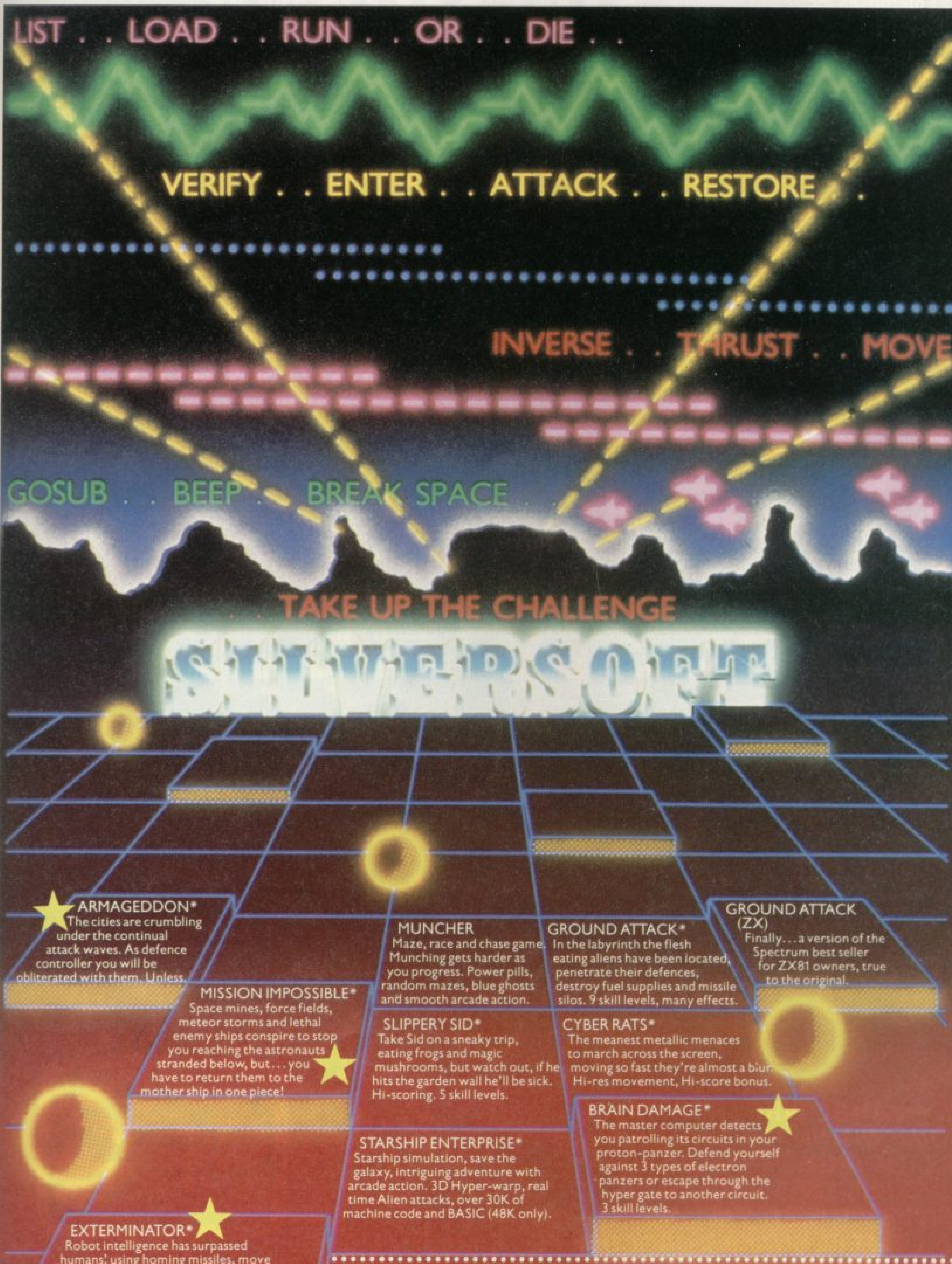
```
260 FOR W=1 TO 700:NEXT W:SOUND 2,20,10,14:POKE 704,0:SETCOLOR 2,
15,14:FOR W=1 TO 65:NEXT W:SOUND 2,0,0,0
262 POKE 87,1:POSITION 6,0:? #6;"1"
265 SETCOLOR 2,8,12:POKE 704,45:GOTO 400
270 POKE 53278,17:X1=83:Y1=67:POKE 704,45
275 FOR J=PB+512 TO PB+639:POKE J,0:NEXT J
277 RESTORE 285
280 FOR J=PB+512+Y1 TO PB+517+Y1:READ A:POKE J,A:NEXT J
285 DATA 63,96,224,224,96,63
290 POKE 53248,X1
295 GOTO 340
298 LG=LG+1:IF LG>5 THEN GOSUB 2500
300 X2=210:Y2=INT(RND(0)*90)+25:POKE 53278,17:POKE 53249,X2
310 FOR J=PB+640 TO PB+767:POKE J,0:NEXT J
320 RESTORE 335
325 FOR J=PB+640+Y2 TO PB+641+Y2:READ B:POKE J,B:NEXT J
330 GOTO 400
335 DATA 31,31
```



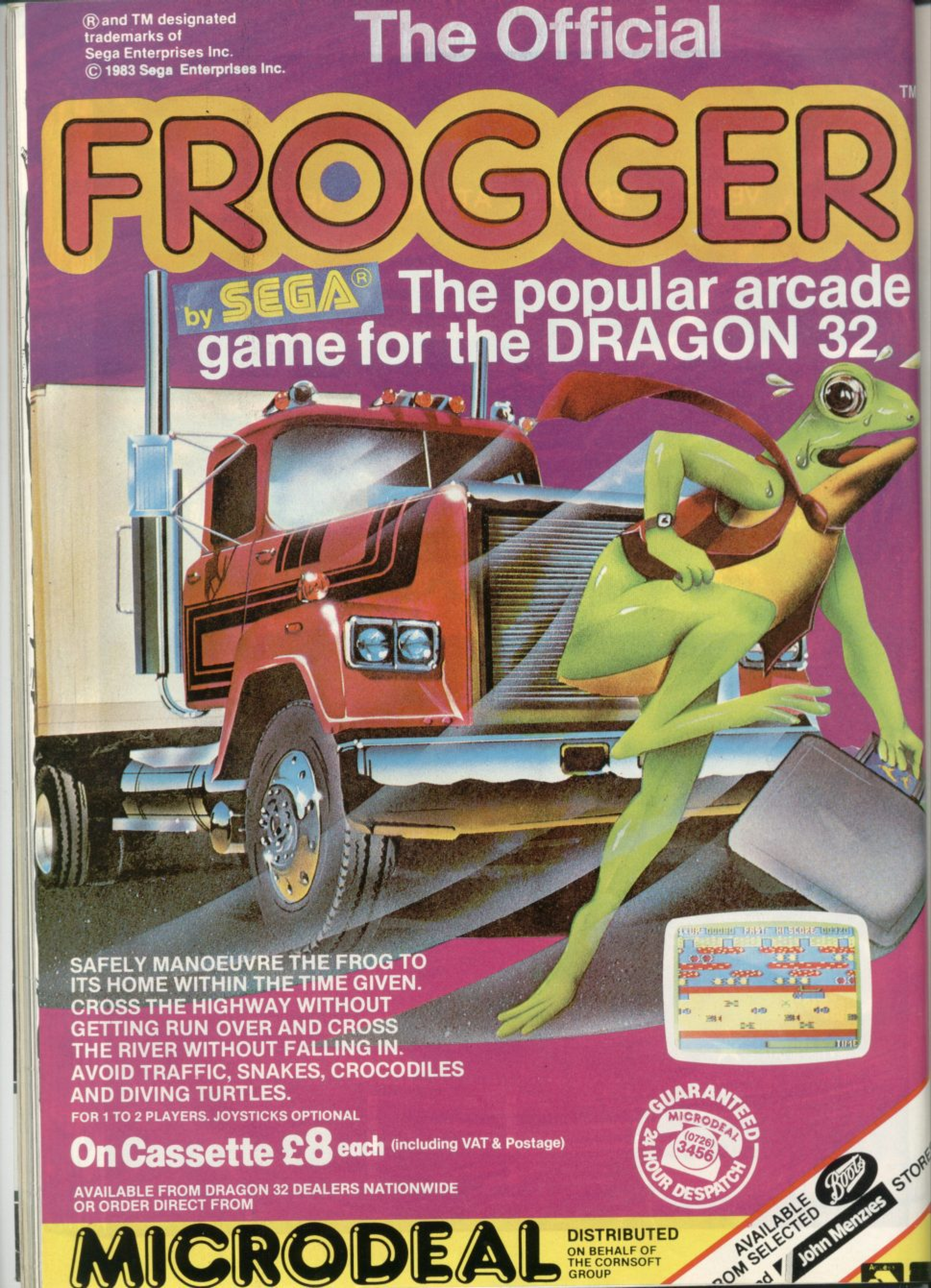
BY STEPHEN LINGER

RUNS ON AN ATARI 400/800 IN 32K WITH JOYSTICK

```
340 Y3=Y1+2:SOUND 0,0,0,0
345 FOR J=PB+768 TO PB+895:POKE J,0:NEXT J
348 IF L=2 THEN 370
350 RESTORE 365
355 FOR J=PB+768+Y3 TO PB+769+Y3:READ B:POKE J,B:NEXT J
360 POKE 53250,X1:GOTO 300
365 DATA 31,31
370 L=0:GOTO 400
390 Y5=Y1+1
400 S=STICK(0):POKE 77,0:SOUND 3,10,0,2
405 POKE 53278,17:X2=X2-SL:POKE 53249,X2
410 IF STRIG(0)=0 THEN 680
415 IF L=1 THEN X4=X4-3:POKE 53250,X4:R=0:IF X4<10 THEN L=0:X4=X3
:POKE 53250,X3:R=0:GOSUB 700
425 H=PEEK(53260):IF H=2 THEN R=1:GOTO 340
427 F=PEEK(53263):IF F=1 THEN GOTO 970
430 G=PEEK(53253):IF G=1 OR G=2 THEN GOTO 80
435 I=PEEK(53254):IF I=1 OR I=2 THEN GOSUB 65:L=0
437 J=PEEK(53252):IF J=1 OR J=2 OR J=4 THEN 7000
440 TM=TM+0.01:IF TM=23 OR TM=34 OR TM=42 OR TM=50 THEN GOSUB 200
0
442 IF CV=1 THEN 445
443 IF SC>DR THEN POKE 53251,95
445 IF X1>210 THEN GOTO 7000
450 IF S=15 THEN SOUND 0,0,0,0:GOTO 400
520 IF R=1 THEN 550
530 IF S=5 OR S=6 OR S=7 THEN X1=X1+2.5:POKE 53248,X1:SOUND 0,200
,12,5:GOTO 400
540 IF S=9 OR S=10 OR S=11 THEN X1=X1-3.5:POKE 53248,X1:SOUND 0,2
00,12,5:GOTO 400
550 IF S=5 OR S=6 OR S=7 THEN X1=X1+2.5:POKE 53248,X1:POKE 53250,
X1:SOUND 0,200,12,5:GOTO 400
555 IF S=9 OR S=10 OR S=11 THEN X1=X1-3.5:POKE 53248,X1:POKE 5325
0,X1:SOUND 0,200,12,5:GOTO 400
557 IF L=0 THEN 560
558 IF L=1 THEN 620
560 IF S=13 THEN 570
565 IF S=14 THEN 580
570 FOR J=1 TO 2:RES=USR(D,PB+511+Y1):Y1=Y1+1:RES=USR(D,PB+767+Y3
):Y3=Y3+1:NEXT J
575 SOUND 0,200,12,5:GOTO 400
580 FOR J=1 TO 2:RES=USR(U,PB+511+Y1):Y1=Y1-1:RES=USR(U,PB+767+Y3
):Y3=Y3-1:NEXT J
600 SOUND 0,200,12,5:GOTO 400
620 IF S=13 THEN 640
630 IF S=14 THEN 670
640 FOR J=1 TO 2:RES=USR(D,PB+511+Y1):Y1=Y1+1 :NEXT J
650 SOUND 0,200,12,5:GOTO 400
670 FOR J=1 TO 2:RES=USR(U,PB+511+Y1):Y1=Y1-1 :NEXT J
675 SOUND 0,200,12,5:GOTO 400
680 IF R=1 THEN 690
685 IF R=0 THEN 695
690 L=1:X4=X1:GOTO 415
695 GOTO 425
700 SC=SC+15:POKE 87,1
705 IF SC<100 THEN POSITION 16,0:? #6;"0":POSITION 17,0:? #6;SC;
706 IF SC>=100 THEN POSITION 16,0:? #6;SC;
710 SOUND 2,25,10,6:FOR W=1 TO 15:NEXT W:SOUND 2,0,0,0:RETURN
720 SC=SC-1:POKE 87,1
725 IF SC<100 THEN POSITION 16,0:? #6;"0":POSITION 17,0:? #6;SC;
730 IF SC>=100 THEN POSITION 16,0:? #6;SC;
750 RETURN
780 TRAP 790:SOUND 1,231,10,10:COLOR 2:POKE 87,7:S=X2-41:T=Y2-23:
PLOT S,T:DRAWTO S+9,T:PLOT S,T+1:DRAWTO S+9,T+1
785 POKE 53278,17:SOUND 1,0,0,0:GOSUB 720:GOTO 900
790 TRAP 795:SOUND 1,0,0,0:PLOT S,T+1:DRAWTO 159,T+1:GOTO 900
795 GOTO 900
900 X2=210:Y2=INT(RND(0)*85)+30:POKE 53278,17:POKE 53249,X2
910 FOR J=PB+640 TO PB+767:POKE J,0:NEXT J
920 RESTORE 935
925 FOR J=PB+640+Y2 TO PB+641+Y2:READ B:POKE J,B:NEXT J
930 GOTO 1010
970 Y5=Y1+1:SC=SC-20:SOUND 0,0,0,0
975 FOR J=PB+896 TO PB+1023:POKE J,0:NEXT J
980 RESTORE 995
985 FOR J=PB+896+Y5 TO PB+899+Y5:READ B:POKE J,B:NEXT J
```



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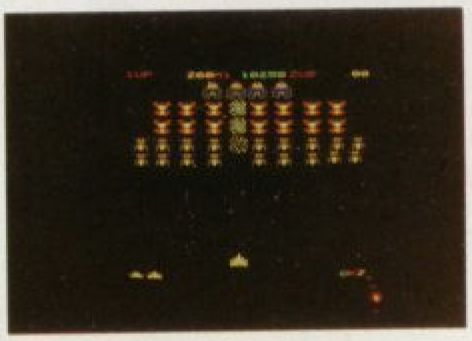
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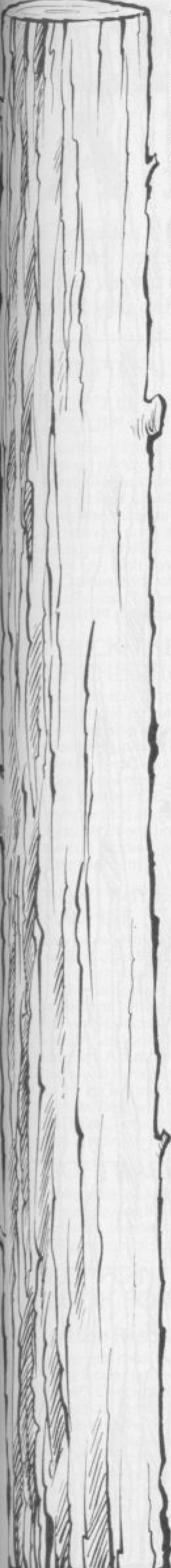

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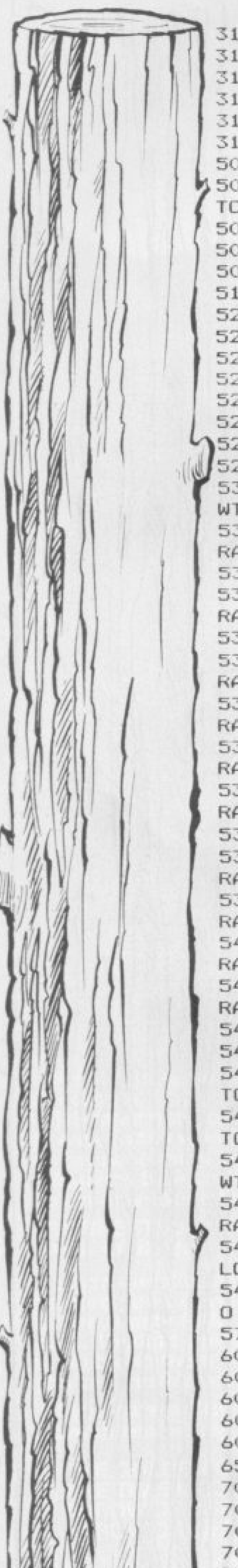
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Next month: watch for the ultimate non-space game!......
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```
990 POKE 53251,X1+6:GOTO 1010
995 DATA 31,31,31,31
1000 REM DYNAMITE
1010 S=STICK(0):POKE 77,0:SOUND 3,10,0,2
1015 IF STRIG(0)=0 THEN POKE 53251,X1+15:GOTO 7600
1025 J=PEEK(53252):IF J=1 OR J=2 THEN 7000
1027 G=PEEK(53253):IF G=1 OR G=2 THEN GOTO 780
1035 POKE 53278,17:X2=X2-(SL+0.5):POKE 53249,X2
1050 IF S=15 THEN SOUND 0,0,0,0:GOTO 1010
1060 IF S=5 OR S=6 OR S=7 THEN X1=X1+2.5:POKE 53248,X1:POKE 53251
,X1+6:SOUND 0,200,12,5:GOTO 1010
1070 IF S=9 OR S=10 OR S=11 THEN X1=X1-3.5:POKE 53248,X1:POKE 532
51,X1+6:SOUND 0,200,12,4:GOTO 1010
1100 IF S=13 THEN 1150
1110 IF S=14 THEN 1160
1150 FOR J=1 TO 2:RES=USR(D,PB+511+Y1):Y1=Y1+1:RES=USR(D,PB+895+Y
5):Y5=Y5+1:NEXT J
1155 SOUND 0,200,12,5:GOTO 1010
1160 FOR J=1 TO 2:RES=USR(U,PB+511+Y1):Y1=Y1-1:RES=USR(U,PB+895+Y
5):Y5=Y5-1:NEXT J
1165 SOUND 0,200,12,5:GOTO 1010
2000 PS=PS+1:SC=SC+20:SOUND 2,20,10,14:POKE 704,0:SETCOLOR 2,15,1
4:FOR W=1 TO 40:NEXT W:SOUND 2,0,0,0
2010 SETCOLOR 2,8,12:POKE 704,45
2015 POKE 87,1
2020 ON PS GOTO 2030,2040,2050,2060
2030 POSITION 6,0:? #6;"2":SETCOLOR 0,15,10:GOTO 2080
2040 POSITION 6,0:? #6;"3":SETCOLOR 0,2,2:GOTO 2080
2050 POSITION 6,0:? #6;"4":SETCOLOR 0,0,5:GOTO 2080
2060 IF PS=4 THEN POP :SETCOLOR 0,10,3:GOTO 9000
2080 RETURN
2500 REM RIVER DROP
2502 IF LG>20 THEN 2506
2505 POKE 87,7:COLOR 1:GOTO INT(RND(1)*14)*5+2505
2506 IF LG>30 THEN 2508
2507 POKE 87,7:COLOR 1:GOTO INT(RND(1)*15+10)*5+2505
2508 POKE 87,7:COLOR 1:GOTO INT(RND(1)*15+15)*5+2505
2510 PLOT 57,42:PLOT 58,42:PLOT 66,47:PLOT 66,48:RETURN
2515 PLOT 56,43:PLOT 57,43:PLOT 65,48:PLOT 65,49:RETURN
2520 PLOT 55,49:PLOT 56,44:PLOT 64,49:PLOT 64,50:RETURN
2525 PLOT 55,45:PLOT 55,46:PLOT 63,51:PLOT 63,52:RETURN
2530 PLOT 54,47:PLOT 54,48:PLOT 62,47:PLOT 62,48:RETURN
2535 PLOT 53,40:DRAWTO 53,50:PLOT 61,47:PLOT 62,49:RETURN
2540 PLOT 52,51:PLOT 53,54:PLOT 60,55:PLOT 61,65:RETURN
2545 PLOT 51,54:PLOT 54,53:PLOT 67,45:PLOT 67,46:RETURN
2550 PLOT 43,35:DRAWTO 45,35:PLOT 20,62:DRAWTO 23,62:RETURN
2555 PLOT 41,36:DRAWTO 43,36:PLOT 18,61:PLOT 19,61:RETURN
2560 PLOT 39,37:PLOT 40,37:PLOT 18,60:DRAWTO 21,60:RETURN
2565 PLOT 37,38:PLOT 38,38:PLOT 19,59:DRAWTO 22,59:RETURN
2570 PLOT 35,39:PLOT 36,39:PLOT 22,58:DRAWTO 25,58:RETURN
2575 PLOT 95,56:PLOT 97,56:PLOT 68,72:PLOT 68,73:RETURN
2580 PLOT 94,57:PLOT 95,57:PLOT 66,71:PLOT 66,72:RETURN
2585 PLOT 100,57:PLOT 98,57:PLOT 65,71:PLOT 65,72:RETURN
2590 PLOT 93,58:PLOT 97,58:PLOT 62,69:PLOT 62,70:RETURN
2595 PLOT 95,59:PLOT 98,59:PLOT 64,70:PLOT 64,71:RETURN
2600 PLOT 97,55:PLOT 63,70:PLOT 63,71:RETURN
2605 PLOT 96,60:PLOT 65,50:PLOT 50,65:PLOT 51,65:RETURN
2610 PLOT 23,48:PLOT 24,48:PLOT 51,52:PLOT 52,47:RETURN
2615 PLOT 49,66:PLOT 50,66:PLOT 29,52:PLOT 30,52:RETURN
2620 PLOT 47,67:PLOT 48,67:PLOT 63,68:PLOT 63,69:RETURN
2625 PLOT 50,53:PLOT 24,49:DRAWTO 26,49:PLOT 52,64:PLOT 52,65:RET
URN
2630 PLOT 16,46:PLOT 19,48:PLOT 50,53:RETURN
2635 PLOT 51,50:PLOT 53,49:PLOT 13,49:RETURN
2640 PLOT 15,47:PLOT 17,48:PLOT 63,56:RETURN
2645 PLOT 18,46:PLOT 18,49:PLOT 67,52:PLOT 30,50:RETURN
2650 PLOT 65,53:PLOT 66,54:PLOT 26,46:PLOT 24,48:RETURN
2655 RETURN
2900 STOP
3000 DIM UP$(21):U=ADR(UP$)
3005 RESTORE 3030
3010 FOR I=U TO U+20:READ C:POKE I,C
3020 NEXT I:RETURN
3030 DATA 104,104,133,204,104,133,203
3040 DATA 160,1,177,203,136,145,203
3050 DATA 200,200,192,8,208,245,96
3100 DIM DN$(21):D=ADR(DN$)
```





```
3105 RESTORE 3130
3110 FOR I=D TO D+20:READ C:POKE I,C
3120 NEXT I:RESTORE :RETURN
3130 DATA 104,104,133,204,104,133,203
3140 DATA 160,7,177,203,200,145,203
3150 DATA 136,136,192,255,208,245,96
5000 REM PLAYFIELD
5010 GRAPHICS 23:SETCOLOR 4,9,6:SETCOLOR 1,2,5:SETCOLOR 0,10,3:SE
TCOLOR 2,8,12:POKE 559,0
5020 ST=PEEK(560)+PEEK(561)*256+4
5030 POKE ST-1,70:POKE ST+2,6
5040 POKE ST+149,65:POKE ST+150,PEEK(560):POKE ST+151,PEEK(561)
5100 POKE 87,7:COLOR 1
5210 FOR A=0 TO 70:PLOT A,1:DRAWTO A,30:NEXT A
5220 A=94:FOR I=110 TO 0 STEP -1
5230 C=RND(1)*0.7
5240 A=A-C:IF A<67 THEN A=67
5250 PLOT I,A:DRAWTO I,94:NEXT I
5260 A=1:FOR I=140 TO 70 STEP -1
5270 C=INT(RND(0)*1.8):A=A+C
5280 PLOT I,A:DRAWTO I,1:NEXT I
5300 PLOT 5,31:DRAWTO 75,31:PLOT 8,32:DRAWTO 74,32:PLOT 10,33:DRA
WTO 74,33:PLOT 13,34:DRAWTO 52,34
5310 PLOT 15,35:DRAWTO 44,35:PLOT 58,35:DRAWTO 73,35:PLOT 17,36:D
RAWTO 42,36:PLOT 60,36:DRAWTO 73,36
5315 PLOT 50,35:PLOT 51,35:PLOT 56,34:DRAWTO 73,34
5320 PLOT 21,37:DRAWTO 38,37:PLOT 23,38:DRAWTO 35,38:PLOT 25,39:D
RAWTO 30,39:PLOT 26,40:DRAWTO 27,40
5330 PLOT 61,37:DRAWTO 72,37:PLOT 61,38:DRAWTO 71,38:PLOT 62,39:D
5340 PLOT 60,40:DRAWTO 69,40:PLOT 60,41:DRAWTO 68,41:PLOT 59,42:D
RAWTO 68,42:PLOT 58,43:DRAWTO 68,43
5350 PLOT 57,44:DRAWTO 67,44:PLOT 56,45:DRAWTO 66,45:PLOT 56,46:D
RAWTO 65,46:PLOT 55,47:DRAWTO 65,47
5360 PLOT 55,48:DRAWTO 64,48:PLOT 54,49:DRAWTO 63,49:PLOT 54,50:D
RAWTO 61,50:PLOT 53,51:DRAWTO 60,51
5370 PLOT 53,52:DRAWTO 61,52:PLOT 51,53:DRAWTO 59,53:PLOT 52,54:D
RAWTO 58,54:PLOT 52,55:DRAWTO 56,55
5380 PLOT 53,56:DRAWTO 55,56
5390 PLOT 38,76:DRAWTO 67,76:PLOT 35,77:DRAWTO 69,77:PLOT 34,78:D
RAWTO 70,78:PLOT 31,79:DRAWTO 71,79
5395 PLOT 31,80:DRAWTO 73,80:PLOT 31,81:DRAWTO 74,81:PLOT 31,82:D
RAWTO 75,82:PLOT 31,83:DRAWTO 74,83
5400 PLOT 40,75:DRAWTO 65,75:PLOT 42,74:DRAWTO 64,74:PLOT 43,73:D
RAWTO 63,73:PLOT 44,72:DRAWTO 62,72
5410 PLOT 45,71:DRAWTO 61,71:PLOT 47,70:DRAWTO 60,70:PLOT 48,69:D
RAWTO 58,69:PLOT 50,68:DRAWTO 57,68
5420 PLOT 51,67:DRAWTO 55,67
5430 FOR A=0 TO 26:PLOT A,66:DRAWTO A,70:NEXT A
5440 PLOT 0,65:DRAWTO 24,65:PLOT 0,64:DRAWTO 22,64:PLOT 0,63:DRAW
TO 21,63:PLOT 0,62:DRAWTO 18,62
5450 PLOT 0,61:DRAWTO 16,61:PLOT 0,60:DRAWTO 16,60:PLOT 0,59:DRAW
TO 17,59:PLOT 0,58:DRAWTO 21,58
5460 PLOT 0,57:DRAWTO 22,57:PLOT 7,56:DRAWTO 21,56:PLOT 10,55:DRA
WTO 23,55:PLOT 10,54:DRAWTO 24,54
5470 PLOT 12,53:DRAWTO 25,53:PLOT 14,52:DRAWTO 26,52:PLOT 16,51:D
RAWTO 25,51:PLOT 16,50:DRAWTO 23,50
5480 PLOT 16,49:DRAWTO 22,49:PLOT 17,48:DRAWTO 20,48:PLOT 18,47:P
LOT 19,47
5490 PLOT 0,56:DRAWTO 10,56:PLOT 0,55:DRAWTO 7,55:PLOT 0,54:DRAWT
O 5,54:PLOT 0,53:DRAWTO 3,53
5700 COLOR 3:PLOT 0,1:DRAWTO 158,1:PLOT 0,94:DRAWTO 157,94
6000 POKE 87,1:POSITION 9,0:? #6;"SCORE:$100 "
6010 POSITION 0,0:? #6;"SHIFT:"
6020 POSITION 0,1:? #6;"PT:xxxxx       "
6030 POSITION 12,1:? #6;"HI:$"
6050 POSITION 16,1:? #6;MSC;:FOR W=1 TO 50:NEXT W
6500 POKE 559,34:GOTO 100
7000 REM PONTOON DESTRUCTION
7050 SC=SC-20:POKE 87,1
7060 IF SC<100 THEN POSITION 16,0:? #6;"0":POSITION 17,0:? #6;SC;
7070 IF SC>=100 THEN POSITION 16,0:? #6;SC;
7080 IF SC<10 THEN POSITION 18,0:? #6;"0"
7100 PT=PT+1:FOR P=1 TO 10:POKE 704,INT(RND(1)*50)+12:NEXT P:POKE
 53248,5:POKE 53249,5:POKE 53250,5:POKE 53251,5
7110 FOR I=0 TO 150:SOUND 2,I,0,14:NEXT I:SOUND 2,0,0,0:SOUND 0,0
,0,0:Y5=62
```



CHOOSING A HOME MICRO

WARNING

Choosing a home micro can be a daunting task to the newcomer, and with an ever increasing number of micros emerging on the market, even up-grading, say, from a ZX81 can be a risky and expensive exercise if the wrong decision is made. It is important to look at the real facts and specifications, and check exactly what you get for your money before choosing your micro-computer system.

THE PITFALLS

"DON'T LET THE ADD ONS ADD UP"

A number of large companies are offering packages that seem to be good value and low cost.
These offers usually have a hidden sting inasmuch as the essential accessories such as connection leads, peripherals and software often carry very high cost premiums.
e.g. software for low cost hardware usually costs between £29 and £49 for a ROM cartridge!!

CHECK THE QUALITY OF THE PRODUCT.

Raw materials are now an area where corners can be cut, and shoddy workmanship during 'building' can effect the 'up-time' of your unit.
Areas to watch out for are unreliable edge connectors, corrosion and poor quality P.C.B.s. Low quality components and bad design will seriously effect the reliability of the end product, and can lead to false economy.

DON'T BUY A GAMES MACHINE

Unless you want just games and nothing else! With a games computer you are limited.
Some computers, however, have the advantage of both games facility plus the whole world of computing to explore, as your interest and skills develop. A real computer system will allow you to expand your knowledge of the Hi-Technology world, and help earn its keep with its added uses in the field of education, communication and home business use.

SOFTWARE

Make sure the system you choose has a growing library of support software, to enable you to realize the full potential of your machine.

KEY POINTS TO LOOK FOR

● High Resolution Colour

In general most home computers have a poor graphics resolution (or detail). Check on the vertical and horizontal resolution in graphic mode and multiply the two numbers together. If the result is less than 35,000, then the graphics can hardly be considered high resolution.
Without high resolution graphics displays such as those used in games tend to be "Chunky" in appearance.

● High Quality Sound

Some computers claim to provide a sound channel when in reality all that can be found inside the computer is a small buzzer controlled by electronic pulses. At the very least a sound facility should provide more than one channel and a raise channel as well (for gun shot effects in games for example). The best systems also provide envelope control of the sound channels to produce very sophisticated effects; very important for generating music. Also look for the ability to connect to external amplifiers.

● Keyboard

For accurate entry of programs and data into a computer it is important that the keyboard has a good tactile feel in operation. Coupled with acoustic feedback the user is fully aware when the computer has accepted his/her actions. Also of importance in a keyboard is layout. A standard computer keyboard layout will familiarise the user with the vast majority of computers used in the world of business and professional applications; very important if the purpose of purchasing a computer is educational.

● RAM

One of the most important features of a computer is the amount of RAM, or memory, included. In general the more powerful and exciting a computer program is the more RAM it requires. But take care, all computers are advertised quoting the total RAM used in the system. Computers use up a great deal of their own RAM for storing essential data and particularly in supporting the graphics display and the CPU.
If it is less than 32K think again, is it enough?

● Computer Language

It is too dificult to program a computer in its own binary language so high level languages are used, the most popular being BASIC. However, there are a number of BASICs, some being very different from the rest.
A de facto standard in the computer industry is Microsoft BASIC.
Learn this one and you will be able to program in the majority of computer BASICs; such an important point if a home computer is to be used to educate your children to face the technology of the future.

● Expansion

As your interest and knowledge of computing grows, you will need a computer system that will grow with you; able to accommodate Printers, Disk-drives, Joysticks, Communications Modem, and Colour Monitor, as well as produce HI-FI sound effects.



Choosing the right system carefully will save you from throwing your money away. Check full specification, plus peripherals and software prices, before you buy. Preferably choose a Real computer system that can expand to meet your needs.

● Software

The computer you choose should have a growing selection of utility software to make the most of its capability.
Remember, computing is here to stay. You can't learn to compute on a toy, or a device which does not behave like a real computer.
In short, look out for a computer which offers all the points above, and you will be sure of getting the best value for money.

To find out which company offers you the right choice, with:-

- Good value, high specification, quality micros.
- A quality, 4 colour, plain paper printer/plotter.
- Communications Modem.
- Micro Disk Drives.
- Comprehensive and growing range of software

TURNOVER... →

The right choice for real computing

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Before making your final choice, check any other home micro in the same price bracket, against the incredible specification of the ORIC-1.

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Superb styling / Full colour display		High Resolution colour graphics 240 x 200 pixels	
Choice of 16K or 48K RAM		Real computer language programming – Basic / Forth	
Latest design technology and circuitry		Teletext/Viewdata compatible graphics (28 rows x 40 characters)	
Real sound – 8 octaves plus Hi-Fi output		Cassette Port & R.G.B. output.	
Centronics printer interface		Fully supported and growing software library	
Colour printer / Disk Drives		A fully expandable system for home, education & small business use	
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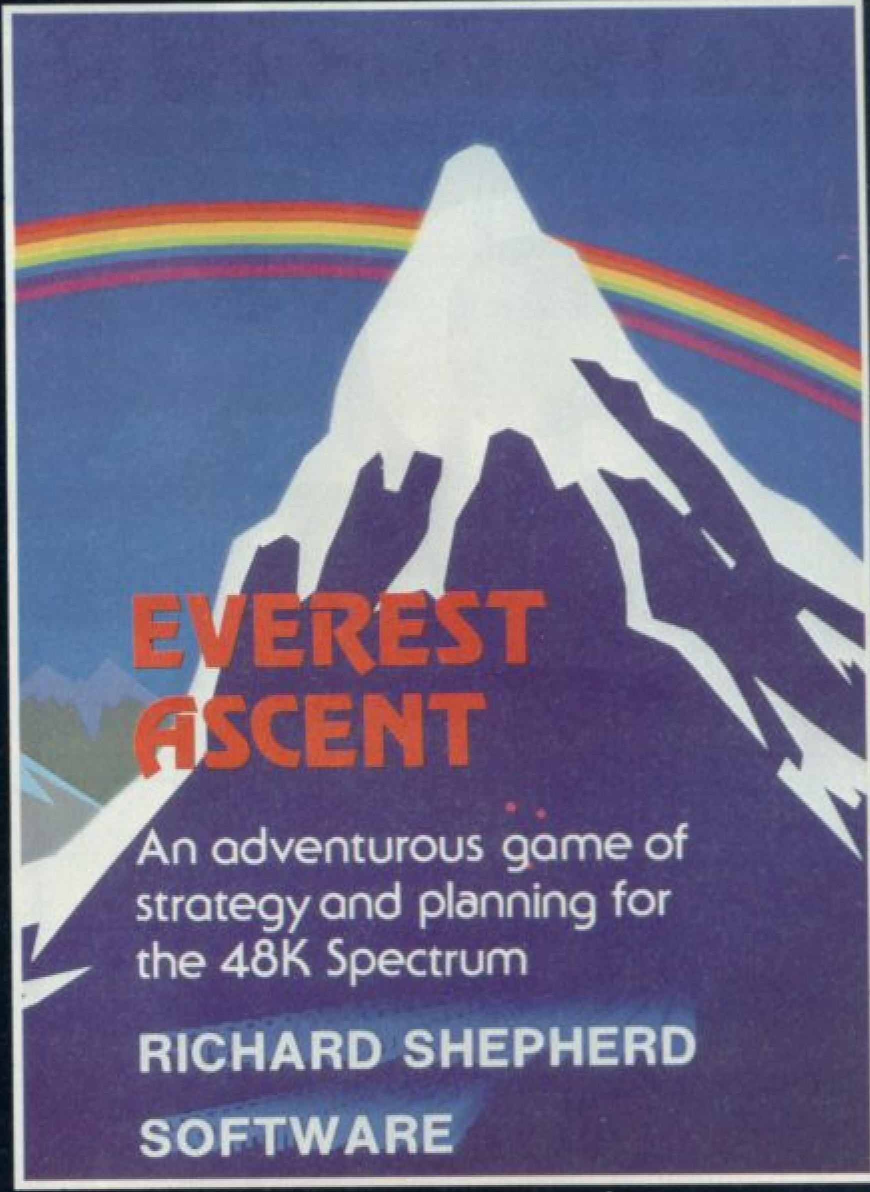
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```
7120 ON PT GOTO 7130,7140,7150,7160,7170
7130 POSITION 7,1:? #6;" ":GOTO 7500
7140 POSITION 6,1:? #6;" ":GOTO 7500
7150 POSITION 5,1:? #6;" ":GOTO 7500
7160 POSITION 4,1:? #6;" ":GOTO 7500
7170 POSITION 3,1:? #6;" ":GOTO 7200
7200 IF PT=5 THEN ZZ=1:GOTO 9000
7500 L=2:GOTO 270
7550 REM DYNAMITE EXPLOSION
7600 FOR P=1 TO 10:POKE 707,INT(RND(1)*50)+12:NEXT P
7605 POKE 53251,5:POKE 87,1
7610 FOR I=0 TO 150:SOUND 2,I,0,14:NEXT I:SOUND 2,0,0,0:SOUND 0,0
,0,0
7620 POKE 87,7:COLOR 4:S=X1-31:T=Y1-23
7630 FOR A=T-8 TO T+8:PLOT S-8,A:DRAWTO S+8,A:NEXT A
7635 PLOT S-6,T-9:DRAWTO S+6,T-9:PLOT S-4,T-10:DRAWTO S+4,T-10:PL
OT S-2,T-11:DRAWTO S+2,T-11
7640 PLOT S-6,T+9:DRAWTO S+6,T+9:PLOT S-4,T+10:DRAWTO S+4,T+10:PL
OT S-2,T+11:DRAWTO S+2,T-11
7645 PLOT S-9,T-6:DRAWTO S-9,T+6:PLOT S-10,T-4:DRAWTO S-10,T+4:PL
OT S-11,T-2:DRAWTO S-11,T+2
7650 PLOT S+9,T-6:DRAWTO S+9,T+6:PLOT S+10,T-4:DRAWTO S+10,T+4:PL
OT S+11,T-2:DRAWTO S+11,T+2
7660 CV=1:GOTO 390
8000 REM TITLE & SKILL LVL SELECT
8010 OPEN #1,4,0,"K:"
8015 GRAPHICS 17:SETCOLOR 4,2,3
8020 TT=TT+1:ON TT GOTO 8030,8035,8040,8045,8050,8055,8060
8030 POSITION 6,5:? #6;"l":SOUND 0,75,10,8:FOR W=1 TO 40:NEXT W:S
OUND 0,0,0,0:GOTO 8020
8035 POSITION 12,5:? #6;"m":SOUND 0,80,10,8:FOR W=1 TO 40:NEXT W:
SOUND 0,0,0,0:GOTO 8020
8040 POSITION 7,5:? #6;"o":SOUND 0,75,10,8:FOR W=1 TO 40:NEXT W:S
OUND 0,0,0,0:GOTO 8020
8045 POSITION 11,5:? #6;"a":SOUND 0,80,10,8:FOR W=1 TO 40:NEXT W:
SOUND 0,0,0,0:GOTO 8020
8050 POSITION 8,5:? #6;"g":SOUND 0,50,10,8:FOR W=1 TO 40:NEXT W:S
OUND 0,0,0,0:GOTO 8020
8055 POSITION 10,5:? #6;"j":SOUND 0,100,10,8:FOR W=1 TO 40:NEXT W
:SOUND 0,0,0,0:GOTO 8020
8060 POSITION 9,5:? #6;"-":SOUND 0,100,10,8:FOR W=1 TO 50:NEXT W:
SOUND 0,0,0,0
8070 FOR W=1 TO 250:NEXT W
8080 POSITION 2,9:? #6;"STEPHEN  LINGER"
8090 FOR W=1 TO 250:NEXT W
8100 POSITION 3,14:? #6;"SELECT  SKILL"
8110 POSITION 7,16:? #6;"LEVEL":FOR W=1 TO 100:NEXT W
8150 POSITION 4,18:? #6;"1":SOUND 0,30,10,8:FOR W=1 TO 20:NEXT W:
SOUND 0,0,0,0:FOR W=1 TO 80:NEXT W
8160 POSITION 9,18:? #6;"2":SOUND 0,30,10,8:FOR W=1 TO 20:NEXT W:
SOUND 0,0,0,0:FOR W=1 TO 80:NEXT W
8170 POSITION 14,18:? #6;"3":SOUND 0,30,10,8:FOR W=1 TO 20:NEXT W
:SOUND 0,0,0,0:FOR W=1 TO 80:NEXT W
8220 GET #1,K
8230 IF K=49 THEN SL=1:DR=200:POSITION 4,18:? #6;"1":GOSUB 8500:F
OR W=1 TO 100:NEXT W:GOTO 30
8240 IF K=50 THEN SL=1.25:DR=250:POSITION 9,18:? #6;"2":GOSUB 850
0:FOR W=1 TO 100:NEXT W:GOTO 30
8250 IF K=51 THEN SL=1.5:DR=300:POSITION 14,18:? #6;"3":GOSUB 850
0:FOR W=1 TO 100:NEXT W:GOTO 30
8300 GOTO 8220
8500 FOR W=1 TO 20:NEXT W:SOUND 0,150,10,8:FOR W=1 TO 30:NEXT W:S
OUND 0,0,0,0:RETURN
9000 REM END ROUTINE
9010 POKE 53248,5:POKE 53249,5:POKE 53250,5:POKE 53251,5:SOUND 0,
0,0,0:SOUND 3,0,0,0
9040 POKE 87,1:POSITION 0,0:? #6;"  FINAL"
9060 IF ZZ=1 THEN POSITION 0,1:? #6;"YOUR FIRED!"
9080 IF SC>MSC THEN MSC=SC
9090 COLOR 2:POSITION 16,1:? #6;MSC;
9100 FOR W=1 TO 800:NEXT W
9120 POSITION 0,0:? #6;"    PRESS  TRIGGER   "
9130 POSITION 0,1:? #6;"      TO RESTART     "
9500 IF STRIG(0)=1 THEN 9500
9510 Q=1:GOTO 8230
9600 REM DONE!
```

Dragon 32

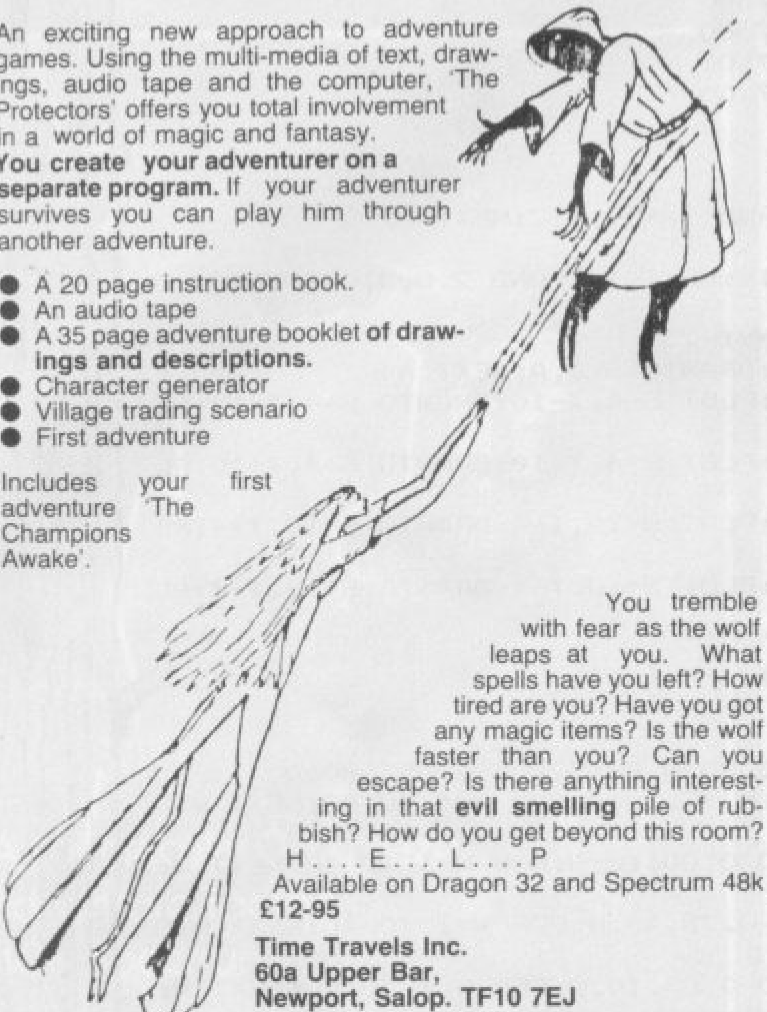
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WHERE ARE YOU TRS-80?

We've been accused recently of neglecting the trusty old TRS-80 in favour of the newer micros. The reason for this is simple — we haven't received any TRS-80 programs which are considered suitable for publishing. So if you'd like to see a good game published for the Tandy machine then why not write one and send it to us. We pay £10 for any listings published.

Meanwhile for all frustrated Tandy owners, here's a few tips for a TRS-80 model I using level II Basic courtesy of Sunil Parekh of Manchester.

The mem-size is stored in locations 16561 and 16562. To program it, use the following routine,

```
10 INPUT "MEM SIZE";M
20 M=M-2
30 POKE 16562,INT(M/256)
40 POKE 16561,M-INT(M/256) *256
```

You can also merge programs on this computer. It's easy if you follow some simple rules.

- Part 2 statements must have higher line numbers than part 1.
- Put part 1 in memory and type PRINT PEEK (16633)
- Type in one of the following lines. If the number printed from above was less than 2 then use line A, otherwise use line B.

A: POKE 16548,PEEK(16633) + 254:POKE 16549,PEEK(16634)−1
B: POKE 16548,PEEK(16633)−2:POKE 16549,PEEK(16634)

- CLOAD part 2.
- Type the following:- POKE 16548,233:POKE 16549,66

Your programs have now been merged, list them and see.

SPACE LASER — TI 99/4a

We've been sent an improved listing of Space Laser for the Texas as published in our November '82 issue. If you'd like a copy, then drop us a line and an sae and we'll send you one post-office haste. Please mark the envelope Space Laser Listing.

USERS GROUP

If you own a Commodore computer, you may not be aware of ICPUG, that's the Independent Commodore Products User Group. Annual membership cost includes help and advice, a newsletter and free programs (you send them a blank disc or cassette and they do the rest).

One such program which I use is a neat utility for owners of 8000 series Pets. This short routine allows an 80 column machine to simulate a 40 column screen, which should allow a fair proportion of 40 column Basic software to run on an 8000.

Machine code programs will probably prove tricky, because the memory maps of the two machines are different. Details of this and other services, plus subscription prices, from the membership secretary Jack Cohen at *ICPUG, 30 Brancaster Road, Newbury Park, Ilford, Essex IG2 7EP*

VIC TIPS

From Gareth Jones of Cleveleys comes a tip for Vic owners. SYS 256 is the same as LOAD, so you could put this at the end of the first listing in a two-part program. You can change nibblers so that it automatically loads nibblers II by changing line 19 of the first program to PRINT "CLR SCRN LOADING NIBBLERS 2": SYS 256. Remember to leave the tape recorder in play mode after listing one has loaded.

3D ROAD RACE — TI 99/4a

The 3D road-race program also in our July issue works correctly. Honest! The only error was some faint printing in line 2120, but at least we printed it in black and white this time. The end of the line should read DIR=1.

FROGGER — TI 99/4a

Just when you thought it was safe to go back to your TI, the Bugs moved in again! Although the Frogger game from the Games Extra in July issue works perfectly and provides a good game in hi-res graphics, the write-up warns of such menaces as turtles, snakes, alligators and a timer on the bottom of the screen.

Well, to put it bluntly, they're not there. The information from the author mentioned them so we passed the information on to you!

What happened to these characters? We don't know! But obviously we will try to find them and publish the missing lines in a future issue.

BALLOONACY-ATARI

For all those balloonatics who couldn't get our August program to run correctly, here's some advice from someone with an illegible signature who lives in Claybrooke Magna, Leicester.

While balloonacy works fine on 16k machines, it locks up when typed into a 32 or 48k Atari. If this happens on your machine try changing line 110 to

110 RT=PEEK(106 :POKE 106,RT-8: GRAPHICS 18

and all should then be well again.

So much for my bit about splitting 3.5k Vic programs into two sections. This works perfectly as long as we remember to print both sections! Look at Brick-Up in our August issue. Apologies to all concerned, especially author Philip Smith. Here's what you've been waiting for . . .

```
10 FORI=7168TO7511
20 READA:POKEI,A:NEXT
25 FORI=7552TO7631:READA:POKEI,A:NEXT
30 DATA223,223,0,251,251,251,0,223
40 DATA60,102,102,126,102,102,102,0
50 DATA124,102,102,124,102,102,124,0
60 DATA60,102,96,96,96,102,60,0
70 DATA124,102,102,102,102,102,124,0
80 DATA126,96,96,120,96,96,126,0
90 DATA126,96,96,120,96,96,96,0
100 DATA60,102,96,96,110,102,60,0
110 DATA102,102,102,126,102,102,102,0
120 DATA24,24,24,24,24,24,24,0
130 DATA30,6,6,6,6,102,60,0
140 DATA98,100,104,112,104,100,98,0
150 DATA96,96,96,96,96,96,126,0
160 DATA66,102,126,126,102,102,102,0
170 DATA102,102,118,110,102,102,102,0
180 DATA60,102,102,102,102,102,60,0
190 DATA124,102,102,124,96,96,96,0
200 DATA60,102,102,102,110,100,58,0
210 DATA124,102,102,124,104,100,98,0
220 DATA60,102,96,60,6,102,60,0
230 DATA126,24,24,24,24,24,24,0
240 DATA102,102,102,102,102,102,60,0
250 DATA102,102,102,102,36,60,24,0
260 DATA102,102,102,126,126,102,66,0
270 DATA102,102,102,60,102,102,102,0
280 DATA102,102,102,60,24,24,24,0
290 DATA126,6,12,24,48,96,126,0
300 DATA24,60,24,60,90,24,36,102
310 DATA126,219,255,102,255,153,36,102
320 DATA170,170,170,170,170,170,170,170
330 DATA255,0,255,0,255,0,255,0
340 DATA255,128,191,160,175,168,171,170
350 DATA0,0,0,0,0,0,0,0
360 DATA255,1,253,5,245,21,213,85
370 DATA85,213,21,245,5,253,1,255
380 DATA170,171,168,175,160,191,128,255
390 DATA85,85,85,85,85,85,85,85
400 DATA0,255,0,255,0,255,0,255
410 DATA60,66,153,165,165,153,66,60
420 DATA189,66,165,153,153,165,66,189
430 DATA126,129,153,161,161,153,129,126
440 DATA18,38,34,114,34,34,34,0
450 DATA22,34,34,118,34,34,38,0
500 DATA60,102,102,102,102,102,60,0
510 DATA24,24,24,24,24,24,24,0
520 DATA60,102,6,12,24,48,126,0
530 DATA60,102,6,28,6,102,60,0
540 DATA24,48,96,108,126,12,12,0
550 DATA126,96,96,124,6,6,124,0
560 DATA28,48,96,124,102,102,60,0
570 DATA126,6,12,24,24,24,24,0
580 DATA60,102,102,60,102,102,60,0
590 DATA60,102,102,62,6,12,56,0
```

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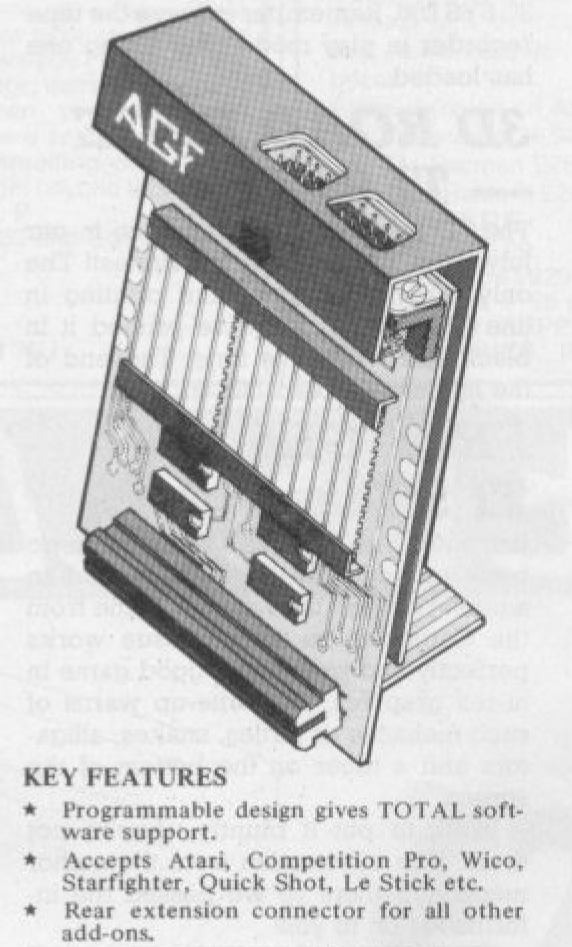
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DUNGEONS OF DOOM by Simon Mansfield. Machine: ZX81/16K/ Spectrum 48K
COBUS MAZE by Dave Gibson. Machine: VIC20 unexpanded joystick or keyboard
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BARON by Simon Mansfield. Machine: ZX81 16K/Spectrum 48K
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12,000 WORDS IN

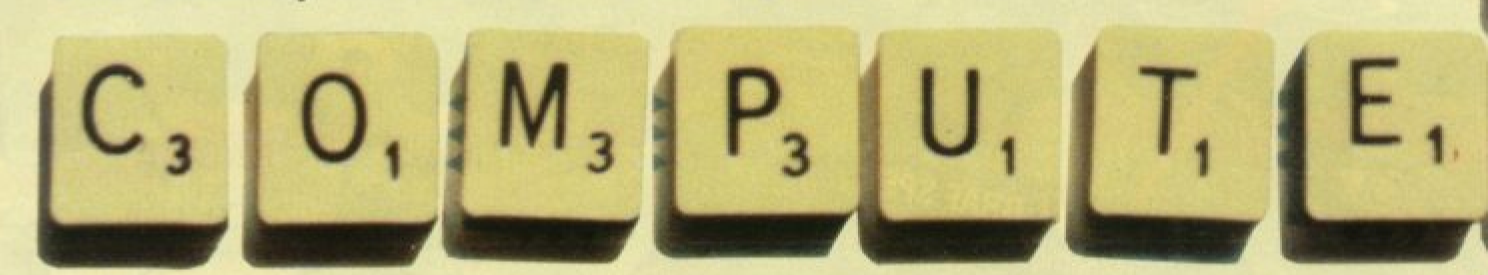
With an inkling of programming expertise, Psion's Scrabble looks a tremendous achievement, but with a lot of computer knowhow, it rapidly borders on the nigh impossible.

A game which not only earns respect from other programmers but wins admiration from experts in a specialised field is rare. And everyone C&VG showed the early version of Psion Scrabble to, was left wondering just how they did it.

We asked Charles Davies of Psion to explain just how he had crammed a 12,000 work vocabulary into 48K and how the machine chose and placed its words.

Then we asked Puzzler-in-chief, Trevor Truran to set a Scrabble Competition. Psion are putting up a first prize of a 48K Spectrum and their Scrabble tape, while J.W.Spear are offering five De Luxe Scrabble sets for the runners-up.

We want to find a top six Scrabblers to take on the Psion game in a final. Closing date for entries is October 16th. Simply play all four hands on the diagram opposite onto the board shown and, after one play each, add the individual scores together.





People are used to computers playing chess or backgammon but they are taken aback by a program which plays a good game of SCRABBLE.

This is because SCRABBLE is a word game and your Spectrum placing words in a human way sets you thinking about artificial intelligence — is it really brighter than you gave it credit for?

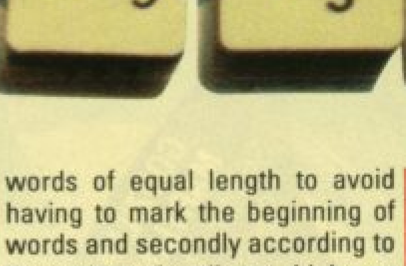
While most people could not write a chess program, they can see that it is conceivable that a chess game could be represented in mathematical terms which could be tackled by a computer. But the link between SCRABBLE and binary is not so clear.

Although the computer appears to be thinking of words it is, of course, scanning a list of words held in its memory. It is not quite that simple however because Psion Computer Scrabble has a dictionary of about 12,000 words which would (assuming an average word length of five letters) require 60,000 bytes of memory if it were stored in the same way that characters are normally stored in a computer. A 48K Spectrum has about 40,000 bytes free for both the program and the dictionary. How is this done?

In fact a variety of techniques were used to compress the dictionary down to about 25,000 bytes — just over two bytes per word. The words are grouped and sub-grouped — first into words of equal length to avoid having to mark the beginning of words and secondly according to the variety of endings which can be appended to a root word, so that root words are only stored once.

Because the words within their groups may be stored in alphabetical order, words which have common beginnings may be further compressed.

By using bit-packing techniques (fitting a letter code into less than the usual eight bits) and Huffman Coding (a data compression technique which cuts down the number of bits used on common letters, like "e"



at the expense of seldom-used letters, like "z") it would have been possible to reduce the compression to almost one byte per word, but at the expense of significantly increasing the time it takes to extract a work from the dictionary.

The 12,000 words are carefully chosen to give a good game and had to be carefully checked for eligibility by former world Scrabble champion, Alan Richter on behalf of Spears — the makers of the original board game. The typing, sorting, arranging and verifying the dictionary used by the computer was a major component of the project.

Having a list of words, the computer needs an algorithm for choosing the best word along with the best position to place that word. Here, best means the highest scoring combination with adjustments for strategy to avoid wasting blanks and the letter "S".

The algorithm used by Psion Scrabble was developed by Peter Turcan as part of his PhD at Reading University.

This algorithm has the quality that is exhaustive which means that, given a word and a Scrabble board, it is capable of systematically and efficiently finding every position on that board which that word can legitimately be placed.

A human player normally tries to make up words from the letters in his rack and to connect this somehow to the crossword on the board.

The Psion Computer Scrabble program works the other way around and looks for the board first, then to its dictionary to determine whether that word could potentially be placed on the board and only finally checks to see if the required letters are in the rack.

The computer simply calculates the score of every word in

NTO 48K WILL GO!

every legitimate position and chooses the best.

Given that there are typically 50 different positions to place a word and that there are 12,000 words to check, this is a huge effort, which is out of the question for humans, but quite possible for a microcomputer, particularly if the program is carefully machine coded.

The program has a particular advantage over its human opponent in that it has no difficulty in finding complex placings where additional words are scored across the direction in which the word is placed.

Most of the remaining effort went into the computer graphics for the board, the amazing dancing tablets and the interface to the user. The ability to set the game up to play itself turned out to be very useful for debugging the program and, before its release, the game had successfully run continuously for many days.

Psion had considered producing Computer Scrabble for the 16K ZX81, but had not pursued the idea because of the relatively small memory of the ZX81.



When approached by Little Genius and Peter Turcan, we were receptive to the concept and enthusiastic for it. Little Genius had rights to Computer Scrabble and had produced a floppy disc version for the 48K Apple II, where the dictionary was held on disc and read as necessary.

We felt that with careful machine code programming and imaginative data compression techniques that we might squeeze the program and the dictionary into the 48K Spectrum.

In fact, we could have fitted a 20,000 word dictionary but favoured a more modest data compression scheme which had the advantage on speed. The Apple uses a 6502 processor whereas the Spectrum uses a Z80, which is entirely different and so the program had to be written from the basics in Z80 machine code. It gives credit to the Spectrum and to the skills of the people of Psion, that a program on a £125 machine, which is superior to a program on a £1000+ disc-based machine.

The computer game does not go all out to win. Had Psion included more two letter words, the program would play for a tighter and more competitive game.

But it was decided that playing an "open" enjoyable game would be preferable for us humans.

Now try our competition below. Mark your envelope "Scrabble" and send it to our Durrant House address.

SCRABBLE COMPETITION

The picture shows the board during a game of Scrabble. The four hands are to be played *in the order North, East, South, West*, Each hand, or the part used, must form a valid word and interlock with the words on the board according to the normal rules of the game.

Each hand is scored in the standard way — including the bonus 50 points in all 7 letters are used. When all four hands have been played the four scores are added to give a final total.

The six highest scorers we hear from will be invited to a final to play against Psion's Scrabble. Psion has put up a 48K Spectrum and Scrabble tape as first prize and Spears are offering five De Luxe Scrabble sets for the runners up. In the event of a tie, first in will be chosen for the final.

Send the diagram, or a copy of it, with your words marked in their positions and the number of points claimed for each hand and the final total. Entries incorrectly scored will be eliminated.

A word, to be valid, must be a bold type entry in *Chambers Twentieth Century Dictionary, (revised edition).*

Those words designated as foreign, or which require hyphens or apostrophes or are proper names are not permitted.



● ***(Scrabble® is the registered trade mark of J.W. Spear Ltd., Enfield, Middlesex.)***

The Lightening Oric Assembler. £9.90*

There are other assembler/editors available for the ORIC but none combine the same features and ease of use that we have obtained with this comprehensive utility program for the ORIC 48K. The manual which accompanies the assembler gives a brief insight into machine code and the use of assemblers to enable anyone to write in assembly language after just a little study. Full specifications of the assembler cannot be fitted into the small space available here and so they may be obtained from your local dealer or direct from Mr. Micro.

*Includes comprehensive instructions booklet.

Crazy Golf £6.90
48K Spectrum

Crazy golf is a new program for the 48K Spectrum you are required to clear the course avoiding and circumventing the many strange obstacles finally putting your ball in the hole. The par for each hole is displayed and a novel direction indicator combined with a force indicator enable you to send the golf ball in the direction you feel is the best one to clear the course. Crazy golf really is crazy but most of all it is fun and will be found to be very enjoyable by all members of the family.

For use with Joystick and keyboard.

Bengo £6.90
Vic 20

An exciting program for the unexpanded Vic 20, which combines fast moving strategy and reflex skills. You must control Bengo the super Eskimo against the dreadful snow Yeti – Half blind and half witted the Yeti can smell a good Eskimo lunch – the only protection Bengo has is to hurl huge blocks of ice across the frozen waste at the Yeti.

– Don't get distracted – or you'll be personally responsible for the demise of an Eskimo!

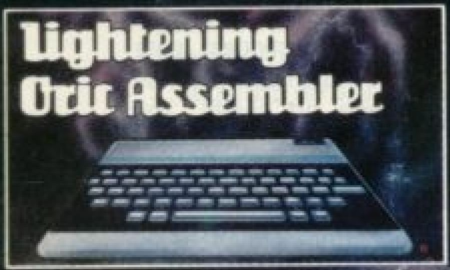
For use with Joystick.

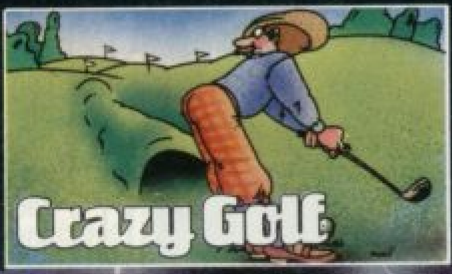
Dracula £6.90
48K ORIC

A superb adventure for the 48K ORIC. This adventure is written in the good old style! No silly graphics, no gratuitous drawings, no distractions from pure mental images of horrendous realism. This evocative text adventure of the old genre will have Oric owners shivering with anticipation and perhaps fear.

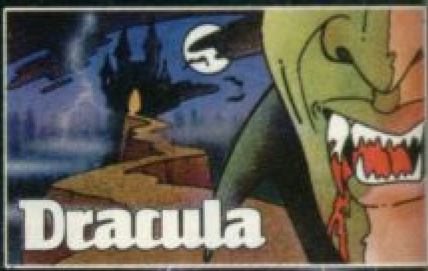
Dare you load DRACULA into your ORIC 48.?!!

By keyboard.





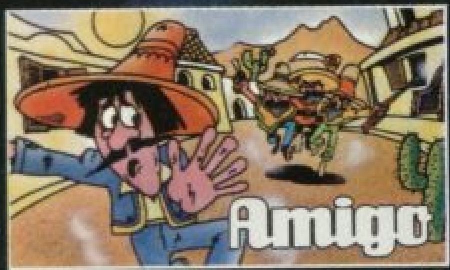


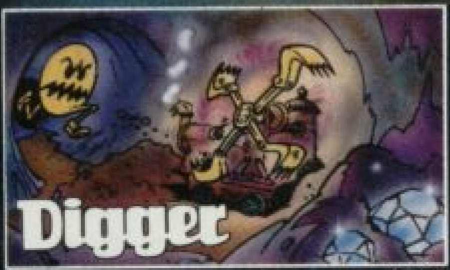


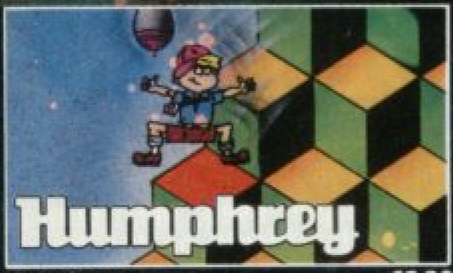
No shocks– Plenty of surprises!

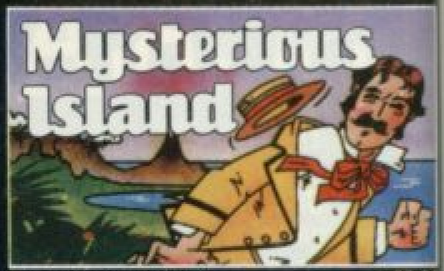
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Amigo £6.90
Vic 20 8K or 16K expansion.

Hey Amigo you gotta run fast ah. The banditos they are a chasing you and they will a geta you ifa you do nota escapa OK. You musta runa rounda the blocka, when you run round de corners ofa de city the banditos they are frightened to go there and you score de points. Pity you have nota gota gun but a joystick can be fun.

For use with Joystick.

Digger £6.90
Vic 20 8K or 16K expansion

Your remote viewer shows the path of the professors devilish digging apparatus. Using your computer linked remote control you must guide the digger beneath the earth to collect the rare micronite gems. Unfortunately the micronite is protected by the micronits who will plague your machine in order to attempt to stop its progress. You may be able to kill the micronits by skillfully manoeuvering your digger beneath a subterranean stalactite which will then fall killing any micronit in its path. This is a novel implementation of a popular arcade game. For use with Joystick.

Humphrey £6.90
Vic 20 BBC Model B

This new game for the BBC Model B or for the VIC 20 (8K or 16K expansion) and also for C.B.M. 64 involves some tricky decision taking.

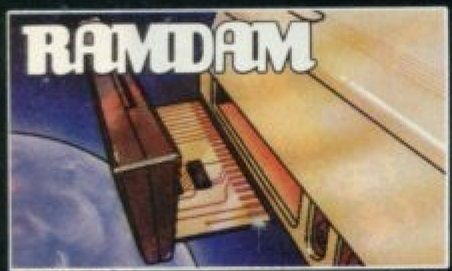
Object of game is to make Humphrey land on all the cubes thus changing their colour. Unfortunately Humphrey is being chased by a bouncing ATOMIC BOMB! You will soon learn that this deceptively simple game has tremendous addictive properties and quite a high degree of tactical skill.

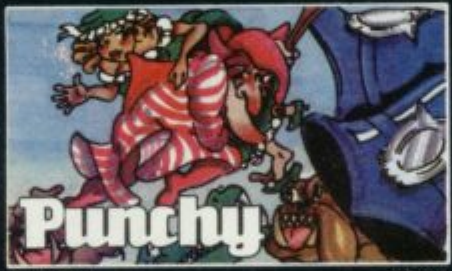
For use with keyboard or Joystick.

Mysterious Island £9.90
Vic 20 16K

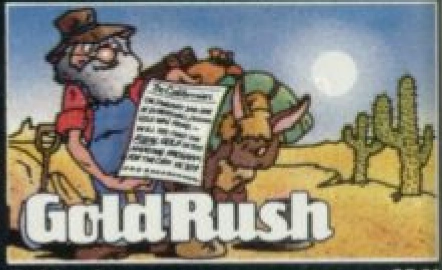
Escape from prison in a hot air balloon – try to land it on Mysterious Island, then the fun really begins. • Booby Trapped Fields • Killer Bees • Hostile Natives • Hidden Clues • Force Fields • Capture the Nautilus • Full Graphic Display • Several Games lead to Exciting Climax • Separate Practice Program • Includes Blank Data Tape to store the game to play later.

All successful adventures can claim a unique personalised award by sending Mr. Micro their final position at the end of the game – By Joystick or keyboard.









RAMDAM £13.90
Vic 20

This accessory enables programs which would normally only work with 3K expansion to work with 8K or 16K expansion. RAMDAM saves having to buy a 3K pack if you already own an 8K or 16K. With RAMDAM and a Commodore 16K expansion all known tape games will run on your Vic 20. • Includes Memory Test Program • Free 6·5K game – MICROVADERS for use with Joysticks.

Punchy £6.90
Spectrum 484

Punch has taken Judy for his evil purposes and locked her away. Judy has called upon the forces of goodness to escape, so with the help of our hero Bobby the policeman and you the purchaser of this fine program you must guide brave Bobby across the stage to rescue poor Judy. Leap the gaps. Jump over the dogs. Leap the alligator pit. Dodge the tomatoes. Rock the crib. Collect the sausages and finally rescue Judy. By Kempstone joystick or keyboard.

Dragon Tamer £9.90
Dragon 32

Allows Atari type and other digital joysticks to be used with the Dragon – giving better response and more control. For the first time your Dragon will be able to reflect your true skills. • Achieve higher games scores • Less Frustration.

Plus To ensure maximum value, Dragon Tamer includes two original games for use with digital Joysticks.

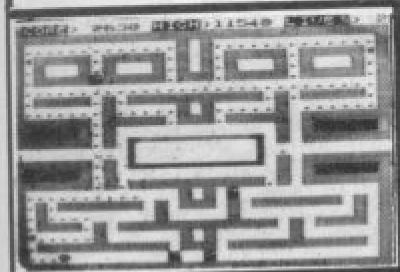
Goldrush £6.90
Vic 20 3·5k

This graphic adventure program was the first in the world to offer real gold for the successful adventurer. An idea which has been much copied but never equalled. • Fun • Educational • Challenging • Clues • Puzzles • Searches • Fast Reaction Game. For use with keyboard.

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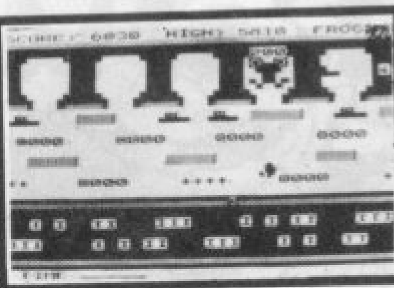
Export Orders: Please add £1.00 per tape airmail



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MAL FUNCTION
T. HITCH
SNAG JNR
SCREAMING FOUL UP
ADVENTURE PROGRAM INSERTED
THE BUGS
LABYRINTH
ENTER AT YOUR OWN PERIL
R.A.M
HEY! YOU'RE NOT GOING IN THERE ARE YOU RAM?
DON'T YOU KNOW HE'S PLAYING AN ADVENTURE GAME?
I'M AFRAID THAT IT IS MY DUTY TO CHECK THAT ALL PROGRAMS ARE RUNNING PROPERLY
WELL! AT LEAST TAKE THIS ANCIENT SWORD WE FOUND AFTER THE LAST GAME....
THANK YOU BUT, I'M SURE YOU'RE OVER-REACTING.
HISS!
.. IT MAY GIVE YOU SOME PROTECTION!
.. THE PERILS IN THESE ADVENTURE GAMES REALLY CAN'T BE THAT BAD!
OUR PROGRAMMER IS GETTING EXCITED!
INSIDE THE MICRO..
WOW! THIS IS THE BEST ADVENTURE GAME YET. I'M BEING ATTACKED BY A DROOLING TROLL...
HMMM! I WONDER IF I COULD CLUB IT TO DEATH WITH THE SALAMI SANDWICH..
TAP!
TAP!
TAPPITY!
HEY!
ANOTHER MONSTER HAS ENTERED THE LABYRINTH. THATS NOT FAIR. I CANT FIGHT TWO OF THEM!!
YARRGH!
YEEK!
LABYRINTH
* * FLASH * *
MESSAGE FROM TROLL TO PLAYER....
STRONGLY OBJECT TO YOUR UNFAIR TACTICS (I.E. USE OF UNPROGRAMMED HELP ADDITIONAL TO SPECIFIED WEAPONS.
THIS GAME IS TERMINATED FOR EVER.
P.S YOUR SECRET AGENT IS NOW SEVERELY DAMAGED.. HEH! HEH!
YOU IDIOT! YOU'VE PROBABLY LUMBERED US WITH THAT LOT NOW!
THUNK!
GROAN! WE DID WARN HIM!
SOB! WHAT DID I DO?
SHUT THE DOOR QUICKLY!
GROAN!

THE SEVEN

TOP SCORERS

Top scorer for the month is Bob Wade from Orpington in Kent. His score stands at 6671, way ahead of his nearest rival.

The remainder of this month's hall of fame looks like this:

1st, Bob Wade with 6671. 2nd, W. A. Mole from Sheffield (4748). 3rd, T. Dibden from London W6 (3916). 4th, N. Woods from Oldham, Lancs (3900). 5th, W. J. Wood of Chorley, Lancs (3583). 6th, I. Grimley of London SW16. 7th, G. T. Marshall from Redditch (3354). 8th, David Speight from Blackpool, (3332). 9th, D. Caldwell from St Martin, Suffolk (3325). 10th, A. Gardner, from Uxbridge (3275).

If you'd like to know how your score for the month compares with those of the heroes above then read on . . .

There were 688 players with a negative profit this month, 2,812 of you scored between 0 and 99, 17 had 100-199 and 17 also had 200-299. 11 managed 300-399 while only 10 scored 400-499. 196 players managed a score of over 500.

This adds up to a total of 3751 players which means that if you'd like to join in the game you'll have to act fast as there is only room for 4000 players in total. Remember that there's a brand new Colecovision games machine for the eventual winner of the game, which has now reached the halfway stage.

To find out your trading profit, look at the black and white table. Cargo profits are black on white and plunder profits are white on black. The name of the star which you travel from is printed in full, and the name of the star to which you move is printed in two-letter form.

All moves for turn four must be with us by Friday September 23rd and must be on the form from this page.

If you're having problems with your moves or you're not sure about the positions of your fleets then you can 'phone the special Seventh Empire number as printed in the rule book. However, as our computer is used for other things besides Seventh Empire, we'll only be able to answer your calls on Friday afternoons.

We keep a list of those orders which failed to arrive in time, so

	As	Ba	Ca	Du	Er	Fa	Ga	He	Ix	Ji	Ko	Li	Mu	Nu	Op	Pu	Qa	Ri	So	Tu	Us	Va	Wi	Xu	Yu
Asol		500		1000	333		1000	83	1000	333	166			333		333	1000		1000		166		250	1000	
Barov					500	500					1000	1000			500	1000		1000		1000		1000	111	1000	1000
Cazuv	250	500		250	333	500			333			1000			1000	500	333		250			1000		250	1000
Dusup					500	500			166		1000			500	333	500	500	200		250		333		1000	250
Erak						1000		250	1000	250			1000	1000	1000			1000			1000				1000
Fadis				500	166						1000						1000			1000					
Gazor	250	500	1000	333	1000	125			333	250	41	83	1000	125	250	55			166		125				
Hezod	250			500		333	250			1000	250			500	1000	166					333			1000	
Ixip	1000	1000	500	111	166	250		1000		1000	111	1000			1000	250		500	500		500	125	166	250	200
Jinis	500	1000			1000		1000	1000				1000	111	1000		500	1000	1000	1000			1000	1000	1000	500
Kolol	166		250		1000			1000	500			500		250		333						250	1000	1000	
Lizag		250			1000	250	250	125								1000					250			166	333
Mupip				333	166					1000	1000				1000	1000					1000	1000	1000		1000
Nuzet	500	1000	500	250		500	500	1000		500					1000			1000			250			500	1000
Opod		1000		333	250	500	333	1000		1000	1000	1000							500	111				1000	
Pulud	250	500	1000		333				1000						250					1000	1000	1000		125	111
Qavuv	250	1000		166	200			1000	166		250	500			250			83	500	83	1000	166	1000		166
Rivw		500			500	333		1000	166		1000			333	1000		250		333	500		200	250	500	250
Soner	333	142	333	125	1000	200	333				333	500	250	1000				1000		166	500			333	
Tubox	500		500	250			500	1000		1000				1000	250				250		250	1000		250	1000
Usugx			111		333	500	500				166	1000	500	100	1000	1000		1000		1000		1000			500
Vasux	1000	200	1000	333		1000		1000				1000	250			1000							500	1000	500
Widan	500	125	500	166	250	500		1000	166	1000	1000		1000		250				500	1000	500	71		1000	500
Xugod	1000	250		1000	1000		71							250		200			1000	1000					1000
Yuses		250	1000				500		200		333		1000	500				250	500			1000		1000	

	Compare new star to the star you left	Moving orders
MOVE:	Does it belong to a **friendly** empire? Is it 1 square away, either vertically, horizontally **or** diagonally?	
TRADE:	Does it belong to a **friendly** empire? Is it 1 square away, either vertically, horizontally **or** diagonally? Is it a **different** star **type**?	
RAID:	Is it 1 square away, vertically or horizontally but **not** diagonally?	Is it the **first** movement phase?
	Does it belong to an **alien** empire?	Is it **followed** by a Return order?
RETURN:	Is the fleet Returning to a star belonging to the **same** empire as it left on the first movement phase?	Is it the **second** movement phase?
	Is it 1 square away, vertically or horizontally but **not** diagonally?	Does it follow a Raid order?
ATTACK:	Does it belong to an **enemy** empire?	If it's first movement phase, is it followed by a Stay order?
	Is it 1 square away, vertically or horizontally but **not** diagonally?	If it's second movement phase, did fleet move in its own empire on first movement phase?
STAY:	Is fleet staying at present star?	Was your first order anything but a Raid order?
CARGO, JUMP AND PLUNDER:	Does fleet start game turn at a Gateway Star?	Has it only one order over both movement phases?
	Does it move to a Gateway Star?	Is the other movement phase crossed out?
	Is it a different Gateway Star?	

Friendly = Empire which a fleet's current empire is **not** at war with.
Enemy = Empire which a fleet's current empire **is** at war with.
Same = **Same** empire as the one you've left.
Alien = A star belonging to an empire **other** than the one you left.

The Checklist Chart is one way of ensuring that you have not entered an illegal order which may result in one of your fleets becoming lost in space.

Whatever movement orders you have given each of your seven fleets, they should be checked against this chart. And if you can answer "Yes" to each of the questions set out there, then the move is a valid one.

If you come up with a "No" then the order is illegal in that context. In order to prompt "Yes" answers, some of the questions are phrased in an unusual way.

ANOTHER CHANCE TO ENTER

If the Seventh Empire appeals to you we still have a batch of rulebooks ready to send out. No guarantees I'm afraid but we'll put you ready should any of the 25,000 fleets currently on the map, drop out. Send in the form below.

Please include me in the Seventh Empire Competition.
I name my tribe:

. . . .

My name is: . . . .
Address . . . .

. . . .

Telephone . . . .

NTH EMPIRE

if you think that you may have missed the date then give us a call and we'll let you know.

TRADING CONTEST

Oops, we've done it again! The bugs have managed to get back into the seventh empire. Well it was my fault actually, sorry. I said that the highest trade index for last month was at Govax with a score of 316. Actually the winner was at Xokeg with a total trade index for turn 2 of 330. Prizes are on their way to the people who wrote in to tell us.

This month's winner of the trading competition is — *definitely* — at Apel with a massive total of a thousand. This fact was correctly predicted by Mr. J. Potter, controller of Malik's Freespacers Galactic Trading Company, from Sunbury in Middlesex.

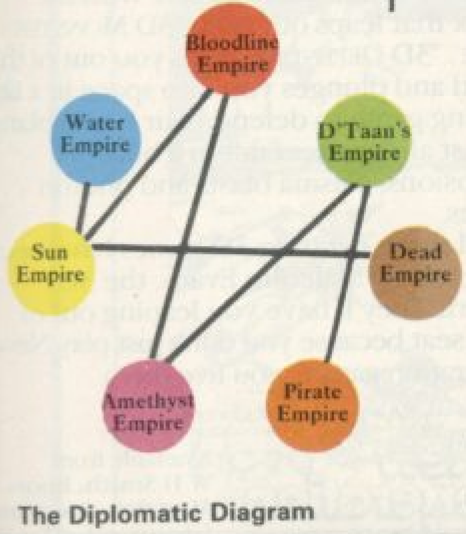
BATTLE REPORTS

There were 24 battles fought this month but none were successful. Yet again the closest fought battle was at apel, although the attacking fleets were heavily outnumbered.

The only non-zero battle bonuses this month were −1 at apel and wagap and −2 at quxin.

The diplomatic diagram for this turn is printed here. Two stars joined by a black line are at war with each other, no line indicates peace. The raid penalty for this month is again 1.

The positions for the imperial ships are Barov, Dusup, Xugod, Yuses, Asol and Jinis. The new controllers of imperial ships are: D'Taans — player 3201. Sun — 2754. Pirate — 511. Bloodline — 100. Dead — 2300. Amethyst — 1877 and Water — 1895.



The Diplomatic Diagram

FOZUZ ○ 254 0	LARUB ♦ 226 107	YIBET ♦ 266 325	XOLIP ♥ 270 69	ITIL ♥ 209 200	FUNUS ♥ 236 60	LULIP ♦ 222 116	YANOK ♥ 262 165	XOKEG ♦ 225 150	ISOX ○ 216 100
VIZAX ○ 225 75	QIRUS ♥ 215 111	HAZAN ♦ 239 330	ABOB ○ 240 62	SONER * 369 100	VEPOZ ♥ 211 216	QATOT ○ 247 166	HEZOD * 401 32	ASOL * 404 77	SUXEK ♥ 227 142
BAROV * 306 150	WIDAN * 311 72	RURUS ○ 240 220	MUPIP * 334 66	NAXIG ○ 220 185	BETID ♦ 216 250	WAVAB ○ 221 140	RIVEV * 336 140	MEGUD ○ 217 160	NABOK ○ 213 250
DALIX ♥ 234 150	OLEX ♥ 255 50	TASAT ♥ 246 42	CAZUV * 299 95	GOVAX ♥ 233 17	DITUG ♦ 257 75	OKAP ♥ 270 213	TOXAZ ♦ 211 52	CIXAN ♦ 242 23	GOTEG ♥ 218 600
ERAK * 312 70	KOVEP ♦ 228 60	USUG * 367 142	PEBOB ♥ 294 60	JADEG ♦ 242 150	ENAK ○ 251 250	KEPAR ♥ 231 213	UGON ♦ 235 150	POROV ♦ 223 100	JINIS * 278 0
FADIS * 311 25	LOKIK ♥ 253 133	YUSES * 332 41	XAPUS ○ 215 366	IXIP * 389 77	FAGIL ♥ 251 96	LIZAG * 307 40	YODAZ ♦ 232 136	XUGOD * 369 127	IBED ♥ 243 71
VASUX * 331 66	QUXIN ○ 213 333	HIPEB ♦ 252 79	ASOR ○ 247 700	SIDAL ♥ 243 111	VIZET ♦ 261 177	QAVUV * 408 100	HAKUB ○ 232 42	APEL ♦ 261 1000	SABAG ♥ 250 70
BUREP ♥ 215 42	WAGAP ♥ 212 300	ROLEK ♥ 263 100	MINEP ○ 221 150	NUVEX ♥ 262 104	BAZIX ○ 234 300	WUPIV ♥ 229 88	RORUL ♥ 263 36	MEDEN ♦ 230 136	NUZET * 324 130
DUSUP * 326 50	OPOD * 309 56	TUBOX * 309 112	CIGER ○ 221 500	GAZOR * 430 58	DABAG ♥ 236 216	OTAN ♦ 233 75	TUXUX ○ 206 200	CESER ♥ 229 550	GIRIX ♦ 215 250
ELAR ○ 227 200	KERUP ♦ 265 300	ULEB ♥ 209 90	PIRAD ♥ 239 15	JAXEL ○ 248 116	EDIB ♦ 226 175	KOLOL * 339 33	UKOP ○ 212 50	PULUD * 337 50	JUVAK ♦ 221 75

The Galactic Map

Orders in Block Caps please

Name: ....

Code No: .... Telephone No: ....

	AT	1st Movement phase ACTION	1st Movement phase STAR	2nd Movement phase ACTION	2nd Movement phase STAR
FLEET 1					
FLEET 2					
FLEET 3					
FLEET 4					
FLEET 5					
FLEET 6					
FLEET 7					

I wish to move the .... Empire's Imperial Ship from .... to ....

Please notify us separately of any change of address.

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Stamina is the vital ingredient of 'ESCAPE', as you'll be venturing into the maze pursued by walking and flying dinosaurs.

ZX81 owners must be prepared for the shock of coming face to face with the T. Rex that leaps out from '3D MONSTER MAZE'. '3D DEFENDER' takes you out of this world and plunges you into space in a fast moving game to defend your home planet against alien spacecraft in a blitz of explosions, plasma blasts and photon beams.

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Knot in 3D for 48K Spectrum *'The most outstanding thing you'll see for a long time' Popular Computing Weekly*	£5.95
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Escape for 16K Spectrum *'One of the best and most original games we have seen for the Spectrum' Sinclair User*	£4.95
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DEALING WITH DOUBLETS

While Black is able to exert pressure early on, White ultimately has the advantage. A sweeping statement to make? Just read on.

White's advantage comes from the last empty squares being broken down into pairs. When Black plays into one square of a pair, White plays into the other. White then usually captures more permanent pieces. Black is the one in this "pair" trouble because the board is inherently even-numbered, and Black starts. These pairs are called doublets.

Doublets exist throughout the game, even in the opening as stated in a previous article. Obviously the position of the pieces on the board may make a nonsense of doublets. But nine times out of 10, completing a doublet provides you with the best move. Most computer programs fail to exploit this simple concept.

The common intrinsic doublets are shown in diagram 1. Obviously the points shown apply to any symmetrical points as well.

AA at c5 and d6 are the opening doublet, which all the best openings repeatedly use. It usually involves minimal piece capture which is good, while cutting to a minimum the opponent's sensible replies. Note also that White cannot complete the doublet in the first move at 1 in diagram 1, which is the reason for Black's opening power.

Points C and D at c2 and d2 are another doublet, used throughout the middle game. The most common is for C to inspire the D response. The next move might be to play at E at e2 or F at f2, which could form another doublet, although E could be played in such a way as to make the F reply poor. For example, all the pieces might then be one colour, which would be terrible.

The side doublet GG at a3 and a4 leads to very complex decisions. Afterwards both Black and White are tempted to temporarily capture the side, by either playing at H at a2 or I at a5. Both are often poor in the long-term.

EMPTY SQUARES

Finally you reach the end-game, where you often come across four empty squares in the corner.

If you have to give such a corner away, then it is often best to play diagonally — by the first doublet JJ at g2.

Your opponent's best reply is invariably to accept the doublet — in other words take the corner.

The remaining squares then form another doublet KK, which creates another rule — if one square is left in a corner, play in it.

Diag 2 shows some special middle-game doublets created by pieces on the board. Only when Black plays in the doublet LL, can White then play in the other L.

So Black would leave the doublet as a reserve, useful for cutting the diagonals from corner to corner for instance — vital in some end-games.

In the MM doublet both could play first, but if White plays first, Black can put a piece in the middle of the side, which is good.

If Black plays MM first, a spare move may be created for White, due to a Black piece at c2 or f2. So both colours would avoid the MM doublet.

The NN doublet would be catastrophic for White to play in first, because the Black replay would enable the a1 corner to be captured. Similarly Black would avoid the QQ doublet.

Diagram 3 is not a doublet, as White has lost the corner Z at a1, as soon as Black plays X at c1. White Y at e1 would not help at any time.

There are drawbacks to playing a pure doublet game, in that your opponent may find a sequence that leads you into doublet trouble or worse, so that blind doublet following may not always be best.

But at least it would be a simple start for a computer, to improve on those around today! Thus the real skill is in knowing when *not* to play the doublet game.

BY ALLAN SCARFF

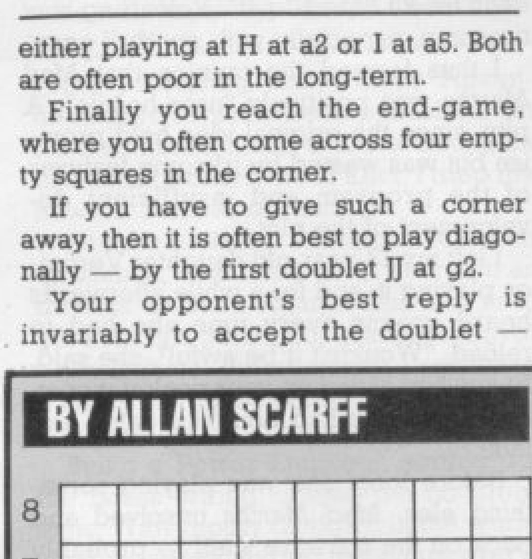


Fig 1.

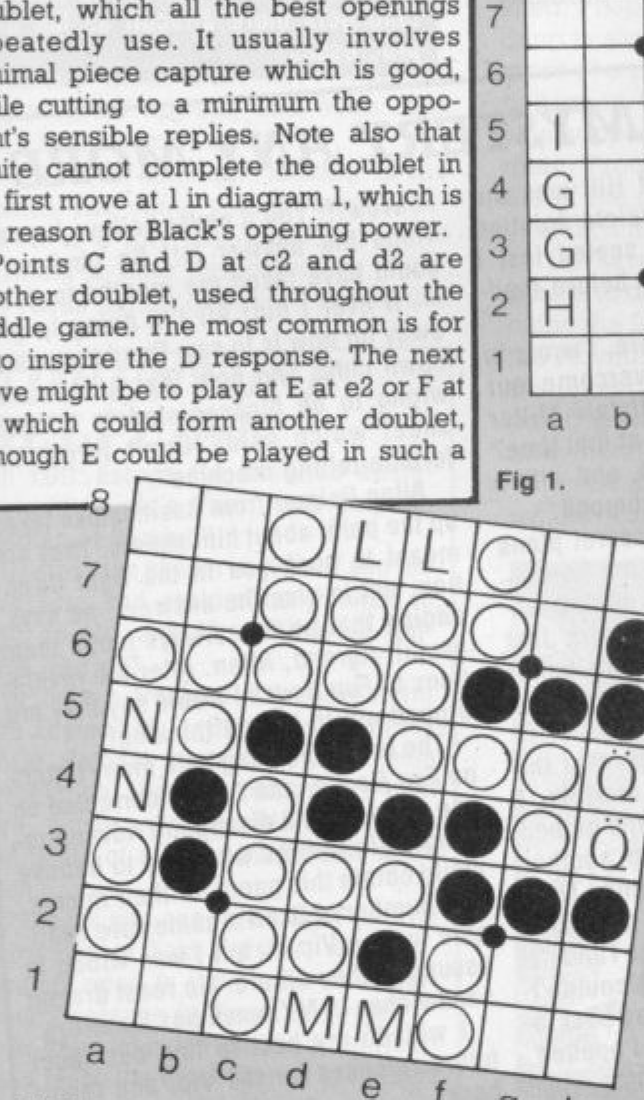


Fig 2.

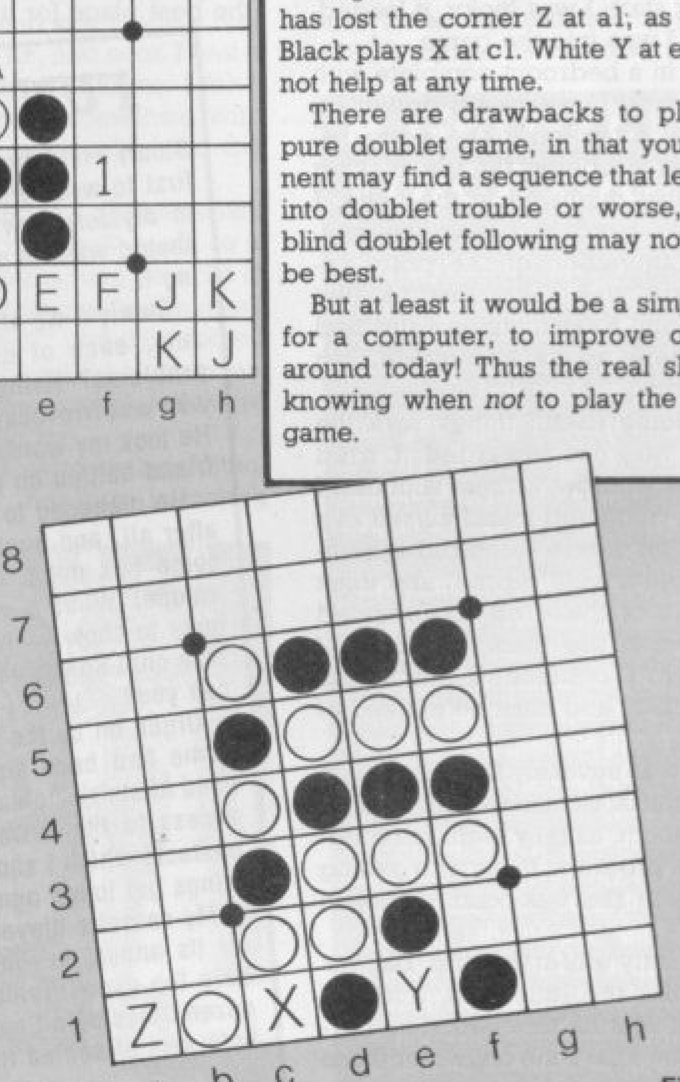


Fig 3.



FRUSTRATED ON THE THRONE!

BY KEITH CAMPBELL

My main criteria for an enjoyable game are that it must have an interesting plot, and be "user friendly".

Mad Martha has been sitting on my software shelf for some weeks, waiting to take its place in the memory of my Spectrum. Its theme intrigued me — taking the role of a henpecked husband who dares not put a foot wrong, but secretly plots to get hold of his wife's money to have a good night out on the town, seemed a safe and satisying revenge fantasy.

Loading the game proved troublesome — I kept getting I/O errors. The cassette label didn't indicate how many copies it contained, so I listened to the lilting melody of the data signals until I reached a spot where I thought another copy might start. I was lucky, it loaded, and at last I was into the game.

It began in a bedroom complete with bed and potty, these being drawn on the screen. Examining the potty revealed a key just below the rim. Risking whatever else might be in the potty, I thrust in my hand and took the key. Further examination of the potty revealed there was a key inside, just below the rim. Examination of the bed revealed there was a key inside, just below the rim . . . !

I tried doing useful things with the potty, but was not rewarded. I tried opening the window without success. I opened the door, and found myself in a corridor, from where I entered a bathroom, complete with "throne" and toilet roll. Neither of these objects reacted when I tried to use them, nor could I have a bath. I concluded that I was extremely clean and must be in need of a laxative.

By now I was severely frustrated with all these pictorial details to hand and no way to use them, as they went unrecognised by the program. I was also getting impatient with the 6-second response time.

Inadvertently entering the baby's room, I woke the little brat, and expected Mad Martha to attack. She certainly did! She killed me on two or three occasions, and each time the program cleared from memory. It did the same each time I typed "quit". Reloading was tiresome, especially with my duff copy.

I thus formed the opinion that *Mad Martha* was positively "user hostile". A pity, since the original idea held promise but was wasted by irksome features of the program and insufficient development of the plot.

I left my 13-year-old daughter Veronica playing it, and for a while afterwards heard groans every time she had to reload. "Wouldn't it be awful", she said, "if you had saved up your pocket money and found you had bought a game like this?"

Before long, she was playing something else, *Mad Martha* unsolved and back on the software shelf — probably the best place for it!

THE GOBLINS RULE — OK?

Hobbit seems to trouble players at every point, and the questions asked by readers are so diverse that it will take some time to cover them all.

Thanks to Adrian Harper from Yeadon, who has explained much of the game. The main sticking point is getting out of the Goblin's dungeon. The best information I have so far appears in the tips section; the best score I have yet heard of is 87.5 percent by Steve Blay of Gayton in Norfolk. Has anyone got right through it?

Espionage Island has been fully explained by S. Dali and others. This, and *Planet of Death* have been the subject of many letters. *Espionage Island* gets more difficult as the game progresses.

FUN NO MYSTERY ANY MORE

Stuart Field from Forest Hill was the first to write with a complete solution to *Mystery Fun House*, sealed lest I should want to persevere before reading it.

Surely if we all persevere, I wrote in July, each of us can overcome our problems? Remember Alistair Miller who was irrovocably stuck at that time? He took my words to heart, and with a friend battled on up in Richmond.

He managed to get the secret plans after all, and wrote to tell me how — some tips open, others a sealed envelope! What a relief, Alistair! Just goes to show — two heads are better than one! So you can all do it now — or can you?

Urged on by the knowledge that the game had been solved by mortals, I used Alistair's "clear" tips, and gained access to the sewer, finding another obstacle which I soon overcame. Then things got tough again and I got shot!

My cassette player being at Tandy's for its annual key-latch fix, I couldn't save the game. Typing my way back a dozen times didn't appeal, so I opened both sets of sealed instructions.

Wow!!! You'd never believe how obvious the answer is!! So obvious, it could have taken me months to guess — if ever I did! All I'm going to give away for now is to say: Read the upside down clue, and note that Alistair was wrong to be disappointed in the hint sheet which said "Don't forget the fortune-telling machine".

Allan Palmer from Basingstoke takes up the point about hint sheets. They are meant to push you in the right direction, not to give the answers, he says, adding that he has always found them useful. Agreed, Allan. After the revelations of *Fun House* I would say they are a good aid to lateral thinking!

The recent postbag held many letters on *Fun House*, and I stand corrected on one point. I must disappoint Adventure-hungry Vic owners who I led to believe could obtain this game for their micros.

A number of Scott's games are available for the Vic — but I was wrong in assuming they all are. No roast dragon sandwiches in MY lunch box tomorrow.

I will do my best to find out about future releases for the Vic, and report back!

MY ADVENTURES UNDER A PILE OF LETTERS

I am buried under a pile. I can see: Letters. Obvious exits: None.
Tell me what to do? GO UP.
OK. I can see letters.
Tell me what to do? TAKE LETTERS.
You are carrying too much. Try TAKE INVENTORY.
Tell me what to do? TAKE INVENTORY.
You are carrying the following: Letters.
Tell me what to do? HELP.
A voice booms out
"Try words like THROW, TEAR, SHRED, LIGHT and any others you can think of . . .

Only joking! Your response to "Helpline" has been terrific. I have letters of all shapes and sizes, with hints and tips and complete solutions; pleas and questions on games I have reviewed, played, or never heard of. They come from Scotland, Clwyd, Yorkshire, Sussex, Norfolk, Merseyside, BFPO South Atlantic, the Midlands and many other places, and are about Hobbits and Dragons, Pirates and Dia-Ice-Hounds, Asyla, Deathmazes, Pyramids and Fun Houses. Especially Fun Houses!!

I delight in reading every one of them, and thank you all for your encouragement and help.

There's no way I can give each of you a mention — a list of names filling a whole page makes incredibly monotonous reading! So forgive me if yours is one of the letters I miss out.

All of them will be filed, then cross referenced and entred on to a disc file, so that, hopefully, tips can be matched to the questions you want answered.

Be assured of one thing, Adventurers out there desperate for help — you are not alone! Someone, somewhere is struggling just as hard as you, and without doubt someone else has the very answer you crave and will be glad to help you! Such is the spirit of *Computer & Video Games* Adventurers — a great crowd!!

So if YOU are desperate, or can help out where needed — drop a line to Keith Campbell's Adventure Helpline, *Computer & Video Games*, Durrant House, 8 Herbal Hill, London EC1R 5JB.

Oh, and one thing more — please mention the micro to which you are referring.

LOST UP A LADDER . . .

When Scott Adams translated *Adventureland* from Basic into machine code, he set a standard, started a series, and popularised Adventure games for micros. He wrote for the TRS-80, and all his Adventures have since been converted for a variety of other micros.

Brian Howarth's *Mysterious Adventure* series, available for a number of machines, also started life on a TRS-80.

Many different micros have appeared on the scene since, and in their wake, a new generation of Adventure games written for them. Few have had the same magical appeal, and even less have been converted.

The TRS-80, although lacking hi-res graphics, has some very powerful features. It is a pity that these days it is becoming a little neglected.

So I was highly delighted to see that some promising new TRS-80 Adventures have recently been published. On the recommendation of Dave Gould, an enthusiast from Hythe in Kent, I tried my hand at *Temple of Bast.*

Temple of Bast is written by Malcolm McMahon, who has a mind every bit as devious as Scott Adams! The aim is to get hold of a gold ingot in ancient Egypt — so I'm told. Unfortunately, I am still in a musty old house in London, and I can't even get out on to the street!

Being a Power Engineer, sorting out the house wiring caused me no problems. With supply on down in the workshed, I happily started to saw up everything in sight! My band saw made a real mess of a spaghetti tin, and soon I had a collection of very diverse items. I felt I was supposed to make something with them. Trouble was — I couldn't for the life of me guess what!

Things then ground to a complete halt — I'd have given my back teeth to a gorilla to discover something new! So in came the family, muttering: "call himself the Adventure expert?" and duly solved the immediate problem! I'd been overdoing it with the saw, and things were now literally looking up!

I must discover how to be less clumsy. As a gardener, my forte is cutting grass. I should have studied the care of roses, I suppose, because obviously I don't know the right jargon.

Temple of Bast is a good Adventure even before the action moves to its main setting, and it has a great sense of humour. I can't wait to reach Egypt!

The difficulty in reviewing a game as good as this is that I want to share with you the funnies and the excitement, but have to restrain myself to avoid spoiling your game!

Let's hope we will see more from Malcolm McMahon in the near future. Meanwhile, Temple of Bast is available from Molimerx Ltd. It runs in on TRS-80 and Video Genie in 16k on cassette for £10.06, and in 32k on disk for £13.51.



ADVENTURE HELPLINE

Can YOU: Escape the deserted wastelands in *Knight's Quest*, and help W. Redman of Barking?

Or cross the chasm in *Wizard and the Princess*, and restore confidence in logic to Mr. and Mrs. Millar in Salfords, Surrey?

Or help a troubled Oric Adventurer with *Zodiac*? W. J. Bailey will visit his GP in Hatfield soon if we can't help between us. His wire cutters won't cut wire, a prisoner keeps glaring at him, and worst of all, the bank vault won't open.

Perhaps you can make light for The Clipshams of East Horsley, who desperately need to illuminate an underground passage in *Sands of Egypt*?

Or help Johnston Barlow from Aberdeen reach the Black Market in *Raiders of the Lost Ark* on his Atari?

A GHOSTLY VOICE CALLS

A 'grate' solution is given by a slide rule. Close the door behind you before chewing things over, and the next steps will fuse together in your mind until it matches the plot, and you get through. From there, you're on your own — for the time being! The rest is too good to tell for the moment! (I can be really nasty when I try!)

When through the Goblins' door, SW,D,N,SE,E and you will find Gollum. Don't talk to him unless you like being strangled! And remember, bulbous eyes mean death in most circumstances. The Bard is found after drifting in the barrel until you are at Long Lake. Go East.

Have a feel in the dark then give her the beads — nothing else! The graffiti on the table is worth reading. Flick a switch and replace a bulb and you should be well on your way!

Use the mirror to reflect the force-field. Later you will have to go dancing, and hopefully you can translate a TV booby-prize into an operational sequence!

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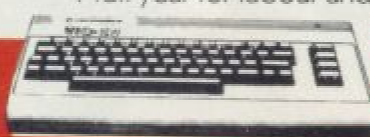
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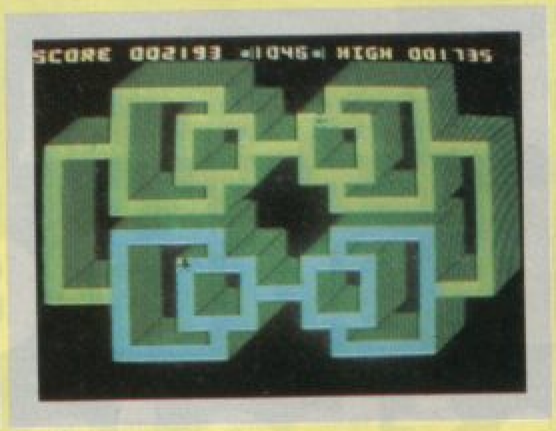
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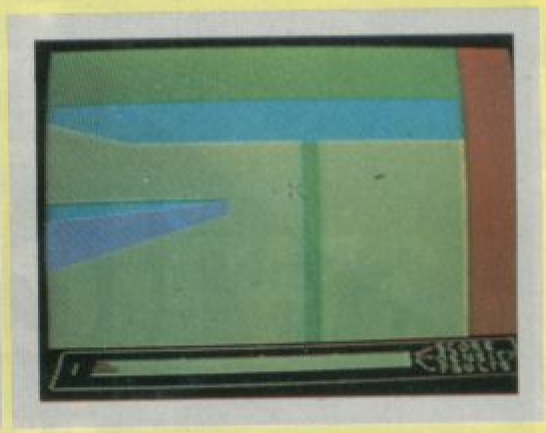




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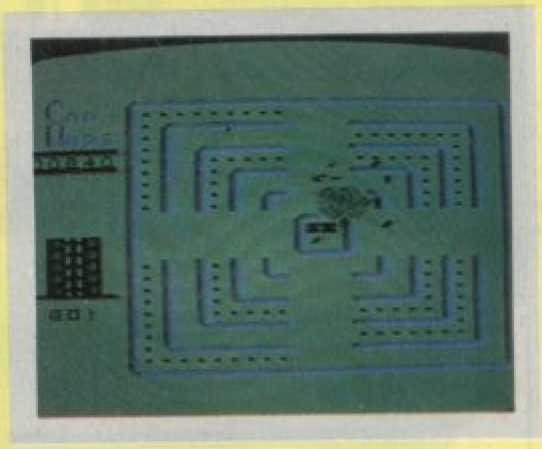


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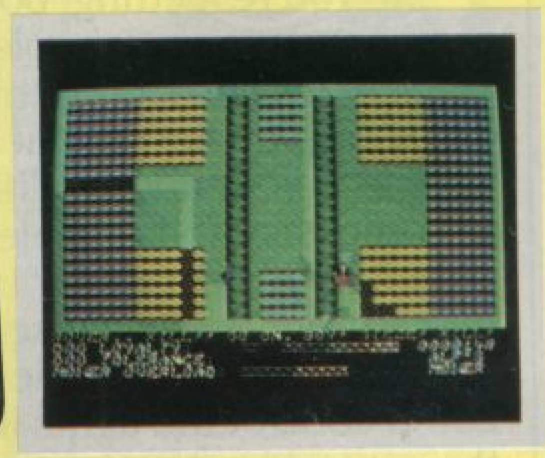


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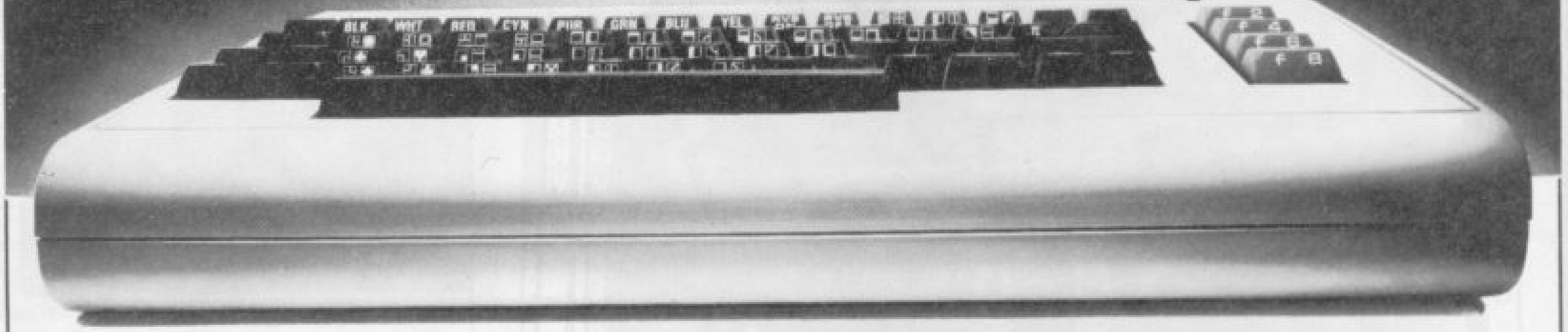
CAR WARS



HOVER BOVVER

There's no getting away from 3D this issue! We turned our review team loose on a range of perspective games for the Spectrum. There's the interesting Terror Daktil's from the people who brought you The Hobbit, on page 146 plus Knot in 3D, 3D Painter and 3D Tunnel all on pages 146/147. If you think we've gone a bit overboard on extra dimensional games never fear, we've also included reviews of a Frogger style game for the BBC called Hopper, on page 145, and there's always our game of the month — Hover Bovver, a gardening game that's a cut above the rest . . . You'll find it on page 148. We also look at one of *C&VG*'s Hall of Fame games, namely Violent Universe, a space shoot-out with a difference. That's on page 145. More than enough to be going on with we think!

It may repel extra-terrestrials, but can it switch on the light in the loo?



If you're getting bored playing games and running simple programs Electronics and Computing Monthly can show you how to put a lot of fun back into your micro. With the addition of some easy-to-build electronic circuits, your computer could drive much more than a TV screen.

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On the cover of the latest issue are the circuit cards for 10 projects, and on the inside we show you what you can do with them. All you need is a hot soldering iron and a cool 75p.

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SPACE CHASE WITH LOTS OF ACTION

VIOLENT UNIVERSE

All your space-born skills will be needed to protect this convoy of spaceships in a mad dash across the universe!

Escorting a convoy through the galaxy, you are suddenly pitched into battle. You find yourself surrounded by hordes of aliens and in the middle of a meteor storm. The idea is to dodge the meteors as they whizz through space from all directions and avoid the aliens as they attempt to collide with you.

Your space craft is equipped with canisters of a deadly gas and your only hope of protecting the convoy is to release this in clouds in the path of an alien or meteor.

On contact with the gas the opposition is annihilated. Six cloudbursts of gas can be released at any one time, and, if you find yourself in a tight corner it's possible to hide in one until you can make good your escape.

Should your reactions be too slow to avoid a collision, you will be blown to bits in a very colourful explosion. You have six lives and a minimum of 40 seconds to score 1000 points before moving on to the next level.

The game becomes more difficult on each succeeding level as the points scored for eliminating the aliens decrease and points deducted for allowing your convoy to be blown up increase. This makes it much harder to clock up 1000 points in the 40 second period.

Strategic planning is necessary in Violent Universe so check how many points are awarded when you blow up the meteors, aliens and aircraft and plan your game accordingly. In this way you will be able to get to the higher levels of the game where the action becomes fast and furious as you try to beat the time limit.

On reaching level 4 and all subsequent levels, you become eligible to enter the Hall of Fame — THE hi-score competition — by sending in your score to Fantasy together with the special code number which will allow them to verify it.

One small grouch, it was not at all easy to identify my convoy among the floating debris of meteors and aliens and this made protecting them very tricky as at first I kept gassing them. This point aside, an addictive game and well worth playing.

Violent Universe is available from Fantasy software (formerly Quest) for the 16 and 48k Spectrum at £5.50.

- **Getting started** 8
- **Graphics** 4
- **Value** 6
- **Playability** 5

GIANT LEAP FOR BBC FROG FANS

HOPPER

Hopper now takes a massive leap from the arcade to your home, taking all the characteristics of the arcade classic with it!

This version from Acornsoft incorporates high-res graphics and sound displaying a clear and concise screen layout.

The object of the game — as if you didn't already know — is to manoeuvre the frog across four busy lanes of traffic and on to a midway bank, which in later screens is patrolled by deadly snakes. Then you have to jump over a river torrent where two lanes of logs swirl down-stream and two lanes of turtles swim in the opposite direction. The turtles must be used as stepping stones. You can pick up dragonfly on the way for bonus points. Some turtles have the habit of diving from under you, while the occasional alligator is waiting in your bank-side home.

I found the game — available for the BBC computer — enjoyable to play and remarkably good value, for only £9.95. Other cheaper versions exist for the BBC but the graphics can't compare to the Acornsoft version.

- **Getting started** 8
- **Graphics** 7
- **Value** 8
- **Playability** 6

OK, LET'S ALL GET KNOTTED!

KNOT IN 3D

From the people who brought you "3D Tunnel" comes another superb game. Knot in 3D is a surround type game where you and the computer travel around the screen leaving trails which you must avoid.

This 3D version is clever and well written. The game is the straightforward surround but the screen is replaced by a large 3D space in which you are travelling. You steer yourself in four directions using the cursor keys which are adequate but take some getting used to. The trails left by yourself and the computer are depicted in fantastic 3D and come towards you at quite a speed.

The trails soon fill up the space and it becomes harder to find a path through the knots.

You can enter a demonstration mode after loading the tape, which provides a stunning display of the graphics capable from a Spectrum.

Most 3D games have either a graphics display or are an addictive playable game — but not both, this is one of the few that combine these qualities.

Knot in 3D from New Generation Software runs on a 48k Spectrum and is well worth the £5.95 price tag.

- **Getting started** 9
- **Graphics** 9
- **Value** 9
- **Playability** 8

THIS PAINTER IS NOT AN OLD MASTER

PAINTER

Your task in this game is to steer the dashing dauber through a maze painting it as he goes. If the maze was drawn in anything like true 3D then the game could be very popular — unfortunately it's not.

The mazes themselves are drawn in two dimensions but have shadows behind them to resemble 3D. Unfortunately this idea does not work too well. There are some marvellous 3D paths produced by the method but the painter simply wanders round the outside.

There are four mazes in all to complete. I managed the first one after about five minutes but assumed that the other three would be harder. I was mistaken. I managed to clear all four mazes after about ten minutes play and the game then had no further appeal to me.

The game uses no high resolution



graphics, the man is badly animated and drawn. You are pursued by a single ghost who appears to have absolutely no intelligence at all. He often comes speeding straight towards you and then goes off in a totally different direction.

This game from CDS Microsystems runs on a Spectrum in 16k. It's not a program which I would spend my hard-earned cash on but if you want to see for yourself then it'll cost you £5.95.

- **Getting started** 8
- **Graphics** 5
- **Value** 4
- **Playability** 7

PREHISTORIC WAY TO GET THE BIRD!

TERROR DAKTIL

The perfect arcade game is a combination of superb graphics and a challenging game. Terror Daktil from melbourne House, the people who brought you the Hobbit, is half perfect. The graphics are among the best that I have ever seen on a micro, but the game itself is fairly ordinary if not boring.

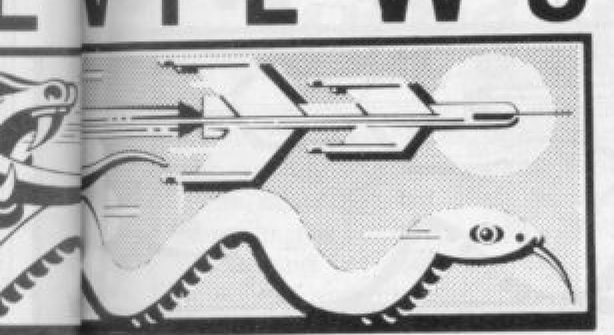
In a place forgotten by time, says the blurb, the beating of wings heralds an incarnation too horrible to believe ... the dreaded monsters swoop down intent on your destruction.

The idea in this game is to destroy the terror-daktils which inhabit the strange land onto which your plane has just crashed. A pilot's eye view of the crash is displayed before the game actually begins although this can be skipped if you wish. The crash portrayed is almost too realistic and in superb 3D. I found myself looking under the seat for that paper bag. (It wasn't there.)

After the emergency you find yourself alone on a plateau somewhere in the South-American Jungle. In the distance you suddenly see some strange creatures grouping together. Is it a space invader?, is it a Pac-Person? No — it's the terror-daktils.

Your only hope of survival in this situation is to drag out an old cannon which you find and use it to fire at the gathering terror-daktils. You can move the cannon in four directions although it

E·V·I·E·W·S



does not physically move up and down, vertical movement being shown by a digital degree indicator instead.

Occasionally a single terror-daktil breaks away from the group and sweeps towards you. Again the graphics are superb. The beast itself is beautifully drawn and comes towards you in 3D, growing larger as it approaches. If its claws touch you then you lose one of your three lives.

As for the game itself, there's little more to it than that. If you survive for six days and six nights then a rescue plane will come to your aid. The game cycles through day and night by changing the screen colour — so that's what the fourth dimension is.

If you want to show off your Spectrum's graphics to your friends then this is the game for you. If you want a game which you'll keep coming back to play, then you can probably find something else to spend your £6.95 on.

- **Getting started** 9
- **Graphics** 9
- **Value** 7
- **Playability** 6

LIGHT AT THE END OF THE TUNNEL

3D TUNNEL

If you're looking for a challenging 3D game then remember there's always a light at the end of the tunnel.

In this game you have to steer yourself through the tunnel which comes toward you in multi-coloured 3D. Your journey is made harder by the various hungry creatures intent on eating you!

If you are eaten or touch the sides then you lose one of your nine lives. For your protection your are equipped with a creature zapper. You must zap the requisite number of creatures before you can progress to the next stage.

One of the most talked about pieces of Spectrum programming awaits you at the end of stage five — a London tube train comes hurtling towards you. If you're unlucky then it'll plough straight into you, from which there is little hope of escape.

If you manage to sidestep it then you'll see it pass in all its glory complete with lights, and passengers at the windows. The games runs on any Spectrum and two versions are available. The smaller version lacks a demo mode and also unfortunately the tube train.

This cassette from New Generation is certainly worth the £5.95 price tag, but may lack addictiveness once the end of the tunnel has been reached.

- **Getting started** 8
- **Graphics** 9
- **Value** 8
- **Playability** 8

PAC-MAN ON WHEELS IS NOT SO HOT

CAR WARS

The Texas entry in this year's Grand Prix for road race games is Car Wars. It's a dodgems-type game and follows the course of the Pac Man on Wheels original.

The screen shows a racing circuit with five lanes, and four places where you can change lanes by a flick of the joystick. The track is strewn with dots and the idea is to race your car through the screen collecting these Pac-Man style. Your opponent in the race is a computer controlled car which travels in the opposite direction.

Selecting the latter takes you into demo mode where you can sit and watch cars racing around the track and changing lanes. To get out of demo you press any key and you then set the diffficulty. There are two categories to set and each has three levels.

The speed of the cars can be creeping, fast or flying but both must be the same. As an added danger the computer's car speeds up during the game by a factor of about three. You can allow this to happen early, late or "look out"!

Also on screen is a high score indicator and a set of lights which tell you when to start racing by flashing from red to green. A nice touch.

If you crash into the computer's car or it crashes into you — which is far more likely — you lose one of your three lives. In terms of graphics a crash is the best part of the game.

Grey smoke clouds billow from the cars and coloured pieces of wreckage fly out in all directions rotating as they fall.

You can buy Car Wars from your Texas stockist on cartridge for £24.95. If you like dodgems then you'll find this quite playable although this is not helped by the awkward joysticks. Adequate use is made of the machines' graphics and sound although this cartridge is nothing exceptional.

- **Getting started** 8
- **Graphics** 7
- **Value** 6
- **Playability** 7

SUPERMARKET



MARIO WITH A LIMP MEETS KONG

KRAZY KONG

Anirog's Krazy Kong is a playable version of the hit arcade machine, although it takes liberties with the original graphics.

Barrels and fireballs are being thrown down at you by the giant ape in an attempt to foil your rescue bid.

The running movement of Mario in this Anirog version is the most ungainly video game animation I have seen in a long time. It looks like Mario has got a limp!

The ape has to be seen to be believed as well. He looks more like a robot than flesh and blood.

These moans aside Krazy Kong does at least reproduce most of the elements of the original.

If you are desperate for a Donkey Kong type game for your Vic then buy Anirog's — available from the Surrey based firm at £7.90.

- **Getting started** 5
- **Graphics** 3
- **Value** 4
- **Playability** 6

ONE MAN WENT TO MOW!

HOVER BOVVER

Hang on 6¼ minutes while I load Hover Bovver. It'll be worth the wait. This is an original game that should be seen *and* heard!

The object of the game is to mow as many lawns — there's 16 in all — as you can before your neighbour starts chasing you round the garden to take his mower back! Don't mow the flowers or the gardener will come chasing you as well!

Your erratic dog will protect you as long as his loyalty level hasn't run out. If Rover's tolerance runs out, he'll turn against you!

The mower is controlled smoothly by joystick, and fire buttons are used to activate the dog if he feels like it he'll defend you fron angry neighbours.

The graphics and sound are excellent and detail is precise. Sound effects include dog-barks, whistles, and even the lawn mower engine noise — all of which are remarkably realistic.

If and when you clear a screen the difficulty level gets progressively harder and you start to wonder if you will ever reach lawn 16!

Hover Bovver is available for the Commodore-64 computer from Hampshire based Llamasoft and is for one or two players. Happy mowing!

- **Getting started** 7
- **Graphics** 9
- **Value** 8
- **Playability** 8

CHOPPERS MAKE YOUR HEAD SPIN

FORT APOCALYPSE

If you thought that Brøderbund's Choplifter was the ultimate helicopter rescue game then think again because Fort Apocalypse has arrived from Synapse Software.

You pilot helicopters on a lone mission to rescue 16 men and destroy the dreaded Fort. Easy, you may think, until you learn that to reach the Fort you have to descend into the Earth's mantle, avoiding or destroying self-propelled mines, servo tank interceptors, robo choppers, laser ports, time envelopes and other hazards!

The game has amazing graphics, utilising fine scrolling (horizontal and vertical), Player missile graphics, redefined characters, and a multi-graphic mode display to name a few. American games actually run slower on the British PAL system because of the scanning lines difference but if this game is supposed to be slower it must be impossible to beat in the States!

The price is £25 for a 32k cassette or disk.

- **Getting started** 8
- **Graphics** 9
- **Value** 8
- **Playability** 9

N·E·X·T · M·O·N·T·H

ALICE'S ADVENTURES CONTINUE..

If you're an Adventurer, or someone who can think up great game ideas at the drop of a hat, then our next issue is the one for you. We're announcing yet another great competition — and this time you can win a brand new chess computer thanks to our friends at Contemporary Chess Computers.

You'll have to rush out to your newsagent on October 16th to discover just how you can win this exciting prize.

We'll also have a feature all about Chess Computers for all our readers missing the late lamented Chess page. There will be another of David Langford's trips into the realms of science fantasy. This one involves falling through a vast bottomless hyperspacial tunnel — and you can join him!

All that plus our regular glut of great games listings.

There's a board game adaptation for the Texas called Ladders and Adders — with snakes that jump off the screen at you!

There's a strange game called Haggis Bash — for all our Scottish readers! Then we've got a maze game with a difference — called Rabbit Raid for the Spectrum. Watership Down was never like this. There's a new version of Missile Command for the Atari plus a few more we haven't decided on yet!

Bug Hunter continues his unceasing battle against the gremlins and our team of reviewers and newsgatherers will be out and about to bring you details of all that's new in the world of *Computer and Video Games*. Can you afford to miss it?

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OUR ELECTRON TOP TWENTY

Way back in our July issue we launched a contest which provoked a response beyond our wildest dreams! We asked you to come up with some original games ideas. Ideas that moved away from the weary old themes of aliens, munchers and invaders.

Since we announced the contest members of the League of Blasted Bugs have been wading through a ton of incredible ideas. Some of which we can't wait to see in action!

However, before we can announce the winner of the top prize — a brand new Electron computer — the long awaited offering from Acorn — we have to give Bug Byte, the company who have put up the prize, a chance to take a look at the top 20 games we've picked out at the *C&VG* office. They will decide the overall winner.

Below you'll find a list of the games, and the names of their authors, that we picked out as the best of the hundreds that flooded in. But first we'd like to say a big thank-you to all of you who spent time and trouble thinking up the new ideas and putting them down on paper. We're sorry we can only chose 20.

Five runners up will receive two software cassettes from the Bug-Byte range, and as an added bonus Bug-Byte may decide to market some of the top 20 if they feel any of the games are good enough. The winner will come from these 20 great ideas!

Double Trouble, Paul McLoughlin, Rainham, Essex. Road Rally, P. R. Ambrose, Gillingham, Kent. Atomia, Stephen Dickinson, Leeds. Spiders, S. Gurney, Bedford, Bedfordshire. The Titan Sanction, Darren Watts, Sheffield. Robin Hood, Philip Rothwell, Ely, Cambridgeshire. Pixie Trouble, Richard Ling, Rainham, Kent. Escape, Philip Oliver, Trowbridge, Wiltshire. Lazer Catch, Grant March, Mallow, Co. Cork. Fairground Fun, D. McCormack, Newton Abbey, Co. Antrim. Jungle Jumper, Andrew Macdougall, Swansea, W. Glamorgan. Librarian, John Reed, Kenton, Newcastle-upon-Tyne. The Mole, Robert Hodge, Ashton-under-Lyne, Lancashire. Zodiac, R. M. Stewart, Edinburgh. The Bullet Express, Adam Ruddle, Bretton, Peterborough. Catn-'Mouse, Binstead, Isle of Wight. Cannon Runner, Robert Hodge, Ashton-under-Lyne, Lancashire. Alley Cat, Helen and Simon Hughes, Walthamstow London. Hooked, Stuart Hemming, Tipton, West Midlands. Art-Hur Tight-Walker, John Woods, Kennington, London.

The winner will be selected by Bug-Byte and announced in the December issue of *Computer and Video Games*.

M·O·N·T·H · N·E·X·T

MACHINE CODE

AWAY FROM THE ABSTRACT

We have been looking at assembly language and machine code in a somewhat abstract fashion, in terms of what individual instructions or short sequences of instructions do to the processor registers and the computer's memory, rather than how to get programs into the machine and run them to get some practical effect.

The practical details vary according to the computer you have and the software you use to help with machine code programming, but there are some general principles.

You will need two pieces of software, an assembler and a machine code monitor. You may find that these come in the same package, or that you have one or the other built in to your computer — for example the Lynx has a built in machine code monitor, and the BBC micro has a built in assembler.

A machine code monitor consists of a number of functions to help you work at the machine code level. The actual features included vary greatly, but a typical machine code monitor will allow you to enter and run machine code programs, inspect and modify memory contents in various ways, load and save machine code on tape, and will include various aids to debugging machine code programs.

SIMPLE MEMORY INSPECTION . . .

The simplest type of memory inspection and modification function, is found in almost every machine code monitor to allow you to type in machine code programs.

You begin by giving the address you want to start from and the monitor will display the contents of the address and allow you to type in a new value that will be placed in the address.

You can then move on to the next address where the same thing happens. As well as this memory display that shows you the contents of



one memory location at a time you will often find that a machine code monitor will allow you to display a whole block of memory, either in hexadecimal or as the characters corresponding to the contents of the memory.

Another useful form of memory display that you will find in most machine code monitors is a disassembler.

This converts the machine code in the computer's memory into assembly language mnemonics, and can be useful for debugging as it allows you to check that your program has been entered into the machine correctly.

ESSENTIAL FOR DEBUGGING . . .

The most essential debugging aid is a breakpoint handler. This allows you to specify an address where the execution of a machine code program will be stopped and control passed back to the machine code monitor.

The monitor will display the contents of the microprocessor's registers when the breakpoint was reached, and some monitors will allow you to change the registers and continue running your machine code from the breakpoint.

Breakpoints are a vefy powerful debugging aid, allowing you to work through your program checking the program flow and the contents of the registers at various points until you find out where the program is going wrong.

ONE STEP AT A TIME . . .

Some machine code monitors include a trace or single step feature that allows you to run through a machine code program one instruction at a time, displaying the instruction and the contents of the registers.

This can be very useful for debugging short programs or longer programs that you can enter very close to the point where you think the bug will be found.

The usefulness of a trace by itself is limited because single stepping a machine code program is so much slower than the full speed of the microprocessor.

Because of the information it has to display a trace routine can only work through a few instructions a second, while the microprocessor will normally run at a rate between two hundred thousand and one million instructions a second.

Trace routines are quite common in monitors for 6502 microcomputers, particularly for the BBC Microcomputer, but are rarely found on Z80 and 6809 machines as the more extensive instruction sets on these microprocessors make it much more difficult to write a trace for them.

Other functions you may find in machine code monitors include searching memory for numbers or strings of characters, moving blocks of memory, and relocating machine code programs to run at a different address. These can be useful but are less important than the basic memory inspect and modify and the breakpoint handler.

BY TED BALL

YOU'LL NEED AN ASSEMBLER

The second piece of software you will need is an assembler, and as with the machine code monitor you will probably need to buy one that has been designed for the computer you have.

It is possible to assemble short programs by hand and use a machine code monitor to type in the hex object code but when the program gets to be longer than about 20 to 30 lines hand assembly is very tedious and prone to error and you really do need an assembler to convert the assembly language to object code and insert it into the computer's memory automatically.

You will find a choice of assemblers available for most small microcomputers, and deciding which one to buy can be difficult. It is best to buy an assembler that is completely standard, or at least as close as you can find to the standard.

Among the advantages of using the standard assembly language are that you can use the language in the form that you learn from books and magazine articles, you can use published program and subroutine listings without modification, and other people can use your listings.

The manufacturers of assemblers for small home computers generally stress that their assemblers accept standard mnemonics, but there is more to an assembly language than just the opcode mnemonics.

You need to study the documentation before you buy, to check that you are getting a two pass assembler that allows you to use labels (preferably six-character labels) and forward references to labels, and also that the syntax for operands is standard and that you can include expressions in operands — addition and subtraction as an absolute minimum and preferably multiplication, division and logical operators as well.

You should also check which number bases you can use in the assembler. Hexadecimal is the most important (although it is extra work to learn hexadecimal arithmetic at the beginning it makes things a lot easier later on) and binary and decimal are also important.

Finally, the assembler you buy should include a range of pseudo-operations or directives. These are instructions that you include in an assembly language source program, but they are instructions to the assembler and do not produce executable machine code.

The minimum directives you should look for are for setting the area in memory that the machine code will be assembled to, assigning values to labels, reserving space within the machine code and for including data in the code.

The data directives should allow you to give the data as one byte or two byte constants (as numbers or labels) and as characters or strings.

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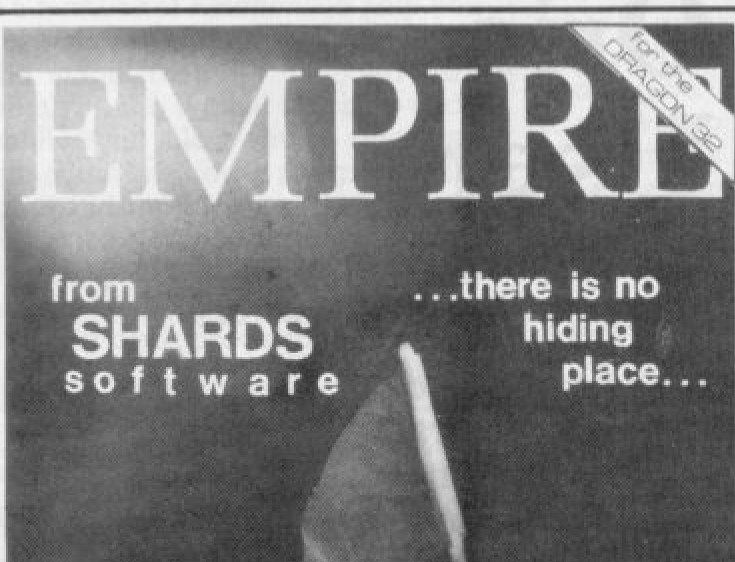
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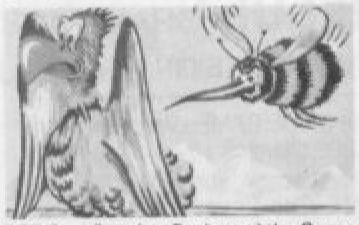
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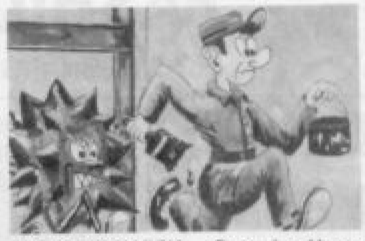
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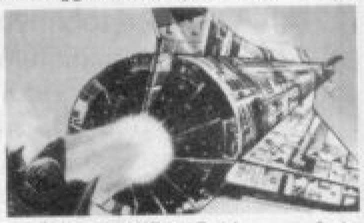
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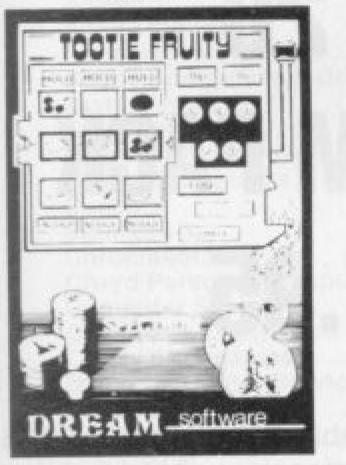
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We would prefer a tape and listing but can work from just a tape and will return it to you if it doesn't find its way into the magazine. We will also need an additional sheet explaining the game and its theme. And any documentation like lists of variables or how certain routines are working, would be of great help to beginners. Please make sure that your name, address and the program name is on everything you send us, including the cassette itself.

This form will merely help us to keep a check on your game as it goes through our testing process and make sure we have all the information we need to present it properly in the magazine.

If you don't want to cut up the magazine, we will accept photocopies or close copies of this page. This form will be appearing regularly in C&VG issues from now on.

Remember we pay £10 for each listing published and you could win our Programmer of the Year Contest where we will try to turn the winner into a best-selling games author.

Program name: ....

Machine make: .... Model ....

Other models it should run on: .... Number of K needed to run it: ....

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Author's Christian name: .... Surname: ....

Address: ....

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.... Tel: .... Date: ....

Type of game: (If original please say so) ....

Loading instructions: ....

Game instructions: (If not included in the listing) ....

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One afternoon, Martha sets out on a bus tour with her son, young Arbuthnot, leaving orders for Manuel to keep an eye on Henry. Unbeknown to Martha, crafty Henry has a Spanish pen-pal, and has planned a secret rendezvous. Henry leaves the hotel, brimming with enthusiasm and Manuel (who is totally wacky!) is hot on his trail. The adventure takes us through the thrills and spills of a madcap chase, taking in amongst other delights, a bull fight in which poor Henry is forced to play the leading role. Guaranteed laughs and fun for all the family!

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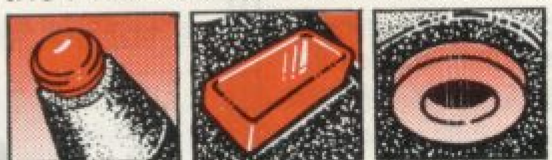
This is a game to invest in ... it's funny, it's genuinely original and the graphics are great ... Hit the key to begin, the Spectrum plays a real Holywood-style movie theme tune, and the hunt is on! **Personal Computer News**

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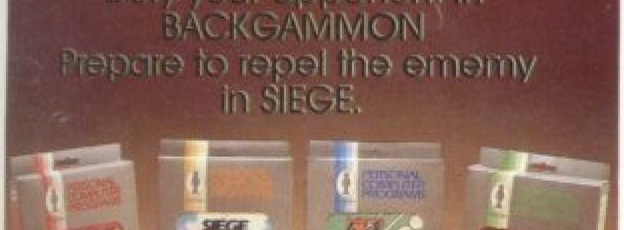
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